

# Amateur Radio

June 1996  
Volume 64 No 6



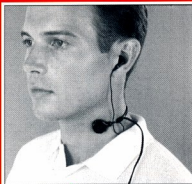
*Journal of the Wireless Institute of Australia*



*Full of the latest amateur radio news, information and technical articles including...*

- A Drew Diamond CW Transceiver for 80 and 40 m
- How to Build Two Metre "Strip" Yagi Antennas
- Review of Yaesu FT-51R VHF/UHF Handheld

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### MAIL DISTRIBUTION

Mail Management Australia Pty Ltd,

88 Herald Street, Cheltenham, VIC 3192.

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### Deadlines Editorial and Hamads

July 10/06/96

August 08/07/96

September 05/08/96

Delivery of AR: If this magazine is not received by the 15th of the month of issue, and you are a financial member of the WIA, please check with the Post Office before contacting the registered office of the WIA. ©

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## Journal of the Wireless Institute of Australia

Vol 64 No 6

ISSN 0002-6859

June 1996

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### Cover

Present at the 1995 North Queensland Amateur Radio Convention, left to right, were Geoff Sanders VK4KEL, President of the WIA Queensland Division, Christine Goode, Spectrum Manager, SMA, and Bob Mann VK4WJ, President of the Townsville Amateur Radio Club Inc. Christine Goode, assisted by Rick Snow, Area Manager for the SMA, and staff from the Townsville office of the SMA, gave a presentation followed by an informal question and answer session.

(Photo by VK4IGM (VK4KIG))

### BACK ISSUES

Available, only until stocks are exhausted, at \$4.00 each (including postage within Australia) to members.

### PHOTOSTAT COPIES

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The opinions expressed in this publication do not necessarily reflect the official view of the WIA, and the WIA cannot be held responsible for incorrect information published.

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A radiocommunication service for the purpose of self-training, intercommunication and technical investigation carried out by amateurs, that is, by duly authorised persons interested in radio technique solely with a personal aim and without pecuniary interest.

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# Editor's Comment

## The Survey Again

The March and April *Editor's Comment* included a general assessment of the results of our readership survey published last December. So far we have commented mainly on the preferences expressed for the work of our regular contributors, with construction and technical articles clearly topping the list. Many would also like to see regular articles on various applications of computers to amateur radio, and we are investigating how best we can cover this tremendous field.

Another popular area for which, at present, we can do very little, is provision of fault-finding and fixing information on popular commercial equipment. As with computers, the problem is to find authors who not only have the necessary knowledge and experience, but also have some spare time! That's the big problem. Such useful people are always busy!

The survey was also very informative in giving us statistics about you, the membership, in general. I mentioned in March that our average age is 59 years. In fact, more than a quarter of the respondents are over 70, and only one claimed to be less than 20 years old. 73% are over 50. But should amateur radio be such an old people's game? It is, and I'm one of them; not 70 yet but getting close! The average respondent has been licensed for 24 years, so the Old Timer's Club (25 years licensed or more) can look forward to a membership boom pretty soon.

To round off the discussion, there were a few questions about the popularity of this, your magazine. Nearly half the respondents claim to read over 80% of the contents each issue. 75% read more than half. We are flattered that you find the magazine so readable, but the compliment also poses a continuing challenge to be sure we deserve your attention. 26% say the contents are not technical enough; 3% think they are too technical; 71% say we have it about right.

Finally, on clarity and readability, over half (60%) think the magazine is excellent or very good, while another 27% rate it as good. Only 2% describe it as poor. Thank you for your praise, people. We hope to continue to deserve it.

**Bill Rice VK3ABP**  
Editor  
ar

## CONTRIBUTIONS TO AMATEUR RADIO

*Amateur Radio* is a forum for WIA members' amateur radio technical experiments, experiences, opinions and news. Manuscripts with drawings and/or photos are always welcome and will be considered for possible publication. Articles on computer disk are especially welcome. The WIA cannot assume responsibility for loss or damage to any material. "How to Write for Amateur Radio" was published in the August 1992 issue of *Amateur Radio*. A photocopy is available on receipt of a stamped, self addressed envelope.



## ■ WIA News

Roger Harrison VK2ZRH, Federal Media Liaison Officer

# Multi-year Licences and Late Payment Penalties Introduced

Following the passage of legislative amendments earlier this year, multi-year licence terms and payment of fees by instalments came into effect on 3 April. At the same time, a "late payment regime" was introduced, with penalty charges for licence renewals not paid within a given period and for expired, unpaid licences.

The new arrangements apply to Apparatus licences, which cover 19 radiocommunications services, including Amateur Radio. The Spectrum Management Agency (SMA) said that licensees now have the option of taking out a multi-year licence, of up to five years, and paying the total cost "up front", and thus paying no further fees during the term of the licence. Alternatively, you can take out a multi-year licence of up to five years and pay the total licence fee by annual instalments over the period of the licence.

The multi-year licence fee comes at a discount, with all but the first year's renewal handling costs subtracted from the total fee. So, a five-year licence, instead of being  $5 \times \$51 = \$255$ , four of the \$11/yr renewal handling costs, or \$44, is subtracted, making the total 5-year licence fee \$211. You could pay this amount at the outset, or pay \$42.20

immediately and send \$42.20 every year until the end of the 5-year term. This is \$5.20 more than the \$37 licence fee prevailing in early 1995 before the new fees regime was introduced.

For licences renewed on an annual basis, if the renewal fee is received up to 60 days late, an additional administrative charge of \$34.50 will be applied. If the payment is received after 60 days from the renewal date, a new issue charge will be applied, the amount

varying depending on the type of apparatus licence. It could be more than \$91, according to SMA advice.

In most cases, these additional charges will be recovered from the amount forwarded with the late renewal, and the term of the licence reduced on a pro-rata basis.

When a renewal is not received by 60 days from the due date, the call sign of the licence will become available for re-assignment. However, in the case of deceased amateurs, providing the SMA is notified, their call sign is not available for re-issue until two years from the date of notification.

For multi-year licences paid by annual instalments, late payments will attract an interest penalty, currently set at 11.5 per cent per annum. But if an instalment payment is not received within 60 days of the due date, the remaining term of the multi-year licence will become due, as well as the penalty interest.

The message is: make sure to pay your licence fees on time, whether you get a renewal notice or not!

## Tariff to Go Back on Amateur Rigs?

The Minister for Industry, Science and Tourism, John Moore, announced changes to the Tariff Concession System in early April, to be effective from 1 July, which would have seen a 5% tariff added to imported goods previously exempt, but representations from industry lobbies saw the scheme modified in early May.

In a release dated 8 May, the minister said all imports eligible for entry under a Tariff Concession Order will be subject to a 3% duty from 1 July. The system covers both consumer goods and business inputs which continue to be eligible for tariff concession orders.

As this seems to cover amateur transceivers, which have been imported for many years under a Tariff Con-

cession Order (TCO) negotiated by the WIA, the WIA Federal President, Neil Penfold VK6NE, has written to the minister, John Moore, seeking clarification and asking for continuation of the previous Tariff Concession Order.

Should the new tariff of 3% be applied, the WIA intends to lobby for its removal on the basis that the Amateur Radio Service is of value to the Australian Community, that the foregone revenue would have an insignificant impact on government income, but the tariff would impact amateur transceiver sales and deter Australian radio amateurs from keeping abreast of world developments in communications technology and techniques.

**Have you advised  
the SMA of your  
new address?**

# Spectrum Sales Rake in Millions

Auction sales of licences for blocks of spectrum in the United States last year brought the American government \$US7.7 billion (almost \$AUS10 billion) from communications companies such as AT&T and Sprint.

The licences are for digital wireless voice and data networks, otherwise known as Personal Communications Services (PCS), and cover set-down bands and geographic regions.

In the first quarter of this year, the US

government has already taken in more than \$US9 billion for more spectrum blocks following new laws allowing more competition in the US telecommunications industry, and a new plan introduced by the Federal Communications Commission (FCC) which allows companies to pay licence fees by instalment.

Licences to cover regional markets bought last year have been traded this year at considerable mark-ups.

Nextwave, a new communications company, offered \$US1 billion for part of a New York regional market sold last year to Sprint for \$US442 million. Another new company, Go Telecommunications, is reported to have bid \$US1 billion for 11 regional markets.

The Australian radiocommunications industry has expressed concern that the Spectrum Management Agency does not use the US PCS spectrum sales as a benchmark for upcoming spectrum auctions in Australia. The executive director of the Australian Electrical and Electronics Manufacturers Association, Alex Gosman, said there were industry concerns about the runaway bids seen in the US.

## SMA to Accredite People to do Beacon and Repeater Frequency Assignments

Before beacons and repeaters can be licensed, or existing ones can change frequency, the proposed frequencies are checked by the Spectrum Management Agency (SMA) for compatibility with other services, to obviate possible interference arising from intermodulation products, for example.

Beacons and repeaters are licensed on an "assigned frequency" basis, similar to Fixed and Land Mobile service Apparatus licences. The local WIA Technical Advisory Committees check beacon and repeater applications for conformance to the relevant amateur bandplans before they're submitted to the SMA.

Where previously the frequency assignment work was carried out by

technical officers within the SMA, legislation which came into effect on 1 April now allows the SMA to accredit other parties to undertake assignment work and issue a "Frequency Assignment Certificate". This certificate can then be used by the SMA to "fast track" licence applications.

The SMA indicates that, initially, there will be some vetting of certificates and associated assignments by the SMA to ensure the integrity of the spectrum management system.

This is a scheme which the WIA has advocated for some time, and the Institute welcomes its introduction.

## A National Amateur Radio Day - We'd Like to See That!

A proposal to introduce a National Amateur Radio Day as a new way to publicise our hobby has been taken up by the Queensland Division following a suggestion from a member, Bernard Terry VK4KAC.

The Queensland Division plans to put a detailed proposal to the WIA Federal

Council at the July Extraordinary Convention.

The basic principle behind it is to have a concerted effort on a single day each year with WIA Divisions and affiliated clubs running open days, displays and coordinated media publicity.

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## ■ Transceivers

# "Little Mate" CW Transceiver for 3.5 and 7 MHz

*Drew Diamond VK3XU\* describes how to build a compact, portable two band transceiver*

At a recent hamfest, a radio friend suggested the following project. It went something like this. "What I'd like is a little two-band transceiver, for taking away on trips, not much less than 5 watts, maybe 80 and 40 metres". I asked him, "DC receiver be okay?" He replied, "Oh yes, no problem with that".

That started me thinking that it should not be too difficult to do, particularly with a DC receiver to keep things reasonably simple. The only snag I could see was the band switching arrangement, which is not usually an easy thing to accomplish without complexity.

So, here is my response to the notion. I have borrowed bits and pieces of circuitry from previous projects, and included one or two new ideas. The prototype model has the measured performance shown in Table 1.

### Circuit

The variable frequency oscillator and doubler is common to both the receiver and transmitter, and is shown in the top half of the schematic, together with the transmitter amplifier. The receiver is in the lower portion.

A conventional Hartley oscillator is buffered by the two-stage follower amplifier, which supplies a low impedance, frequency adjustable 3.5 to 3.6 MHz signal. For transmission and reception of 7 MHz signals, the frequency is doubled through a push-push amplifier. With a matched pair of transistors, and careful adjustment of the balance trim pot between the emitters, suppression of the (now) unwanted 3.5 MHz component is about 50 dB.

The receiver is similar to that used in the "TCF", except here it is a direct

conversion (DC) model. The 500 MHz bandwidth of the NE602 makes it somewhat prone to VHF breakthrough if you are close to such transmitters. Therefore, incoming signals must first negotiate the transmitter's low-pass filter. TV, FM and other unwanted VHF signals are thus effectively prevented from entering the set. A receiver input band-pass filter then selects the wanted band, either 3.5, or 7 MHz.

In an attempt to keep band switching complexity to a minimum, receive frequency range is selected by simply powering the appropriate product detector for the band in use. The need for coil switching is thereby avoided, and the scheme works remarkably well. Product-detected output is applied to the input of a conventional '741 - '386 audio amplifier with HF roll-off. Overall gain is sufficient to provide sensitive, pleasingly clean reception, even where signals are below the microvolt level.

For normal CW working, we should endeavour to be "netted" onto the same frequency as the other station. However, to obtain an audible "beat note" we must tune our receiver off a bit, perhaps by one kHz or so to hear the other station, but only during receive. On transmit it must automatically "snap back" to the same frequency. To achieve this facility, receiver incremental tuning (RIT) is provided on receive mode by making the VFO frequency slightly variable with the use of a diode tune arrangement. The amount of forward bias current through a diode at the source tap of the oscillator tank coil alters the effective capacitance at this point. On transmit, the current level reverts to approximately that of the mid-pot travel value, sourced through the 470 ohm resistor. Type 7805 5 V regulator chips are used for the +5R and +5T supplies. When supplying only a few mA, these chips provide a remarkably stable voltage.

For transmission, a signal of either 3.5, or 7 MHz is presented to the 2N3053 broad band driver stage, which has a gain of about 10 dB, and is again raised to about 3 W with a cheap but rugged IRF511 (or similar) power MOSFET as PA. Any harmonic energy is effectively removed by passing the Tx output signal through an appropriate

**Table 1**

#### Receiver

Frequency Range:	Nominally 3.5 to 3.6, and 7.0 to 7.2 MHz.
Sensitivity:	0.5 $\mu$ V for 10 dB S+N:N.
Reception Modes:	CW, SSB, DSB and AM.
RIT:	Nominally $\pm$ 2.5 kHz on 3.5 MHz, 5 kHz on 7 MHz.
Frequency Stability:	Less than 100 Hz drift in any hour after warm-up.

#### Transmitter

Output Power:	At least 3 W, typically 4 W into 50 ohms.
Frequency Range:	Same as receiver.
Keying Ratio:	80 dB, with no click or chirp.
Harmonics:	"Sub harmonic" and harmonics, at least -46 dBc.
Frequency Stability:	Same as receiver.
Output Load:	Nominally 50 ohms. Can withstand any SWR (including short and open circuit) without damage.
Brag Factor:	During one QRP test weekend, contacts were made with VK1, 2, 3, 4, 5 and 7 using a dipole antenna.





**"Little Mate" transceiver**

low-pass filter. For clean, crisp CW keying, the voltage supply to the 2N3053 and PA bias network is ramped on and off in response to the key through a 2N3906 current switch.

### Construction

A reasonably compact "travelling mate" radio was the aim. Accordingly, the dimensions of my home made aluminium "shoe-box" is 185 mm long x 165 mm wide x 90 mm high. I'm blessed with good eyesight, yet I would

not have wanted to make my own model much smaller than this. If size is not a consideration, larger dimensions would perhaps make construction a bit easier for you.

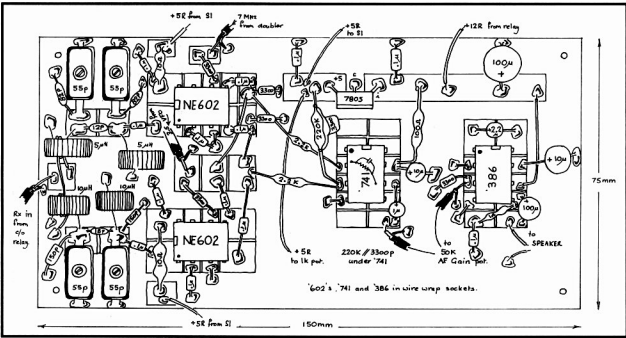
The chassis is formed by front and back "tray" type panels, with three internal "sub-chassis", which collectively produce a particularly rigid and compact assembly, whilst at the same time giving easy access to all circuitry. Naturally, a ready made box of suitable

dimensions would suit. Some sort of slow-motion vernier drive is recommended for the frequency dial. That shown is one from Dick Smith, part number P-7170.

"Paddyboard" style circuit board construction (Reference 7) was used for the three boards, which are VFO doubler, receiver, and transmitter. However, any of the current popular methods should do, provided plenty of ground plane foil is retained, and connections for signal carrying components are as short as reasonably practicable. Naturally, if only the transmitter, or receiver section is required, it is only necessary to build that part. Indeed, if desired, a single band job is possible.

The VFO/doubler may be tackled first. Good screening, mechanical rigidity and thermal buffering is obtained by mounting these components upon a circuit board fitted inside a metal box, preferably die-cast. Not cheap, but worth the investment.

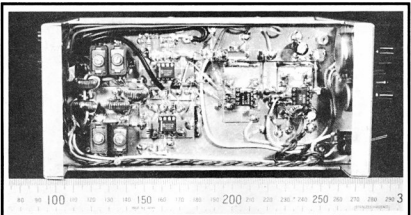
An aluminium or printed board style box would also serve as second choice, or where reduced weight is a goal. We require (as always) a stable VFO. To that end, fixed capacitors must be polystyrene, NP0 (black spot, or marked



**Figure 2 - Receiver board layout**

such) or silver mica if available. Employ the best constructed variable capacitor that you can obtain. Mine is one of those fine English Polar types with brass plates and dual ball-bearings, although an ordinary one with aluminium plates should be adequate at these frequencies. Remove plates if necessary to obtain 20 or 30 pF worth at full mesh. Hold it up to the light and look between the plates to see if any particles are trapped there. Clean any grit from between the plates and bearings and re-lubricate if necessary. Finally, check that the spindle rotates easily and smoothly.

The VFO coil may be wound upon a (nominally) 5/16" or 8 or 7.5 mm bakelite former. Bakelised paper tube (perhaps from an old IF transformer) will also serve. We don't need a slug – remove it if there is one. Drill two 1 mm holes spaced 20 mm apart across the diameter of the former if it has no tags. If the former has tags, you will need just one hole spaced 20 mm from the base. Run off about 1.5 m of wire from the spool, then fix the spool in your vice. Solder the bottom "earthy" end to an appropriate tag, otherwise pass the wire through the bottom hole with a bit to spare. Whilst maintaining tension on the



**Receiver Board**

wire, walk towards the vice and wind on the wire, always making sure each turn lies right next to the last. When you have wound on 11 turns, pinch out sufficient wire to twist up a little pig-tail for the source tap, then wind on the remaining 39 turns. Take care poking the other end of the winding through the top hole, keep finger and thumb there to stop the coil from springing off. The coil must be sealed by coating the winding with Q-dope, Estapol (TM) or shellac.

When building the doubler stage, go through your 2N2222s with a transistor

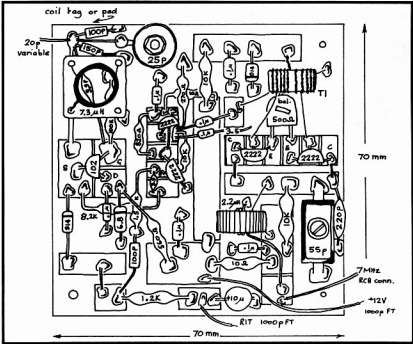
gain checker and select two devices which are closely matched.

Check the VFO/doubler upon completion of this assembly. Preset the 500 ohm balance trim-pot for mid-range. Apply +12 V to the supply feed-through. A screwdriver blade inserted into the 3.5 MHz output connector should radiate sufficient signal to be heard on a nearby receiver (BFO on) tuned to that frequency. With the 20 pF variable capacitor at full mesh, adjust the 25 pF beehive trimmer so that exactly 3.500 MHz is generated. The frequency should be about 3.6 MHz at the other end of the variable capacitor's range.

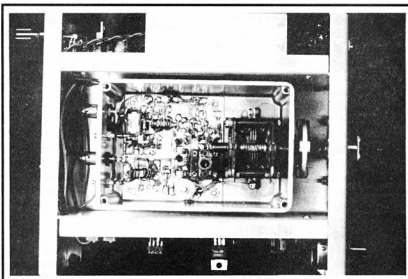
If, for some reason (probably component tolerances), the trimmer cannot bring about the correct frequency, change one of the fixed capacitors, smaller or larger as required. Replace the VFO cover. Some 10 minutes warm-up should have the device settled down and producing a satisfactorily stable frequency. Certainly, by listening you should not detect any significant wobbles or variations in "beat note" in the receiver. The tone should be quite constant (assuming of course that the receiver is stable).

If you have a counter, apply the VFO output to the counter's input and observe the frequency, then adjust as described.

Tune the test receiver to 7 MHz. Insert a screwdriver blade into the 7 MHz output. Adjust the 55 pF trim cap for maximum signal at the receiver. Apply an RF probe/DMM to the 7 MHz output



**Figure 3 - VFO and doubler board layout**



**VFO and doubler assembly**

chuck of a hand-drill. Whilst maintaining tension, turn the drill until you have about three twists per cm. Pull the drill to set the twist, then remove the pair. Carefully wind about 11 loops (not critical) onto the core. Snip the wires leaving about 2 cm for terminating. Remove about 1 cm of enamel from each wire end. With a multimeter on ohms, identify the two "windings". Connect the end of one winding to the start of the other winding to form the tap. Winding starts are shown schematically with a dot.

T1 is made similarly, but this time with three wires. The twist must be even, with no bumps or transpositions. Fix the three wires in your vice jaws, spaced about an inch, or two cm between. Crank up the twist. The drill will tend to be pulled towards the vice, but maintain that tension the whole time. Identify the windings. Connect the start of one winding to the finish of another, and push that group to one side, which leaves the primary as a single winding.

The IRF device may be installed when the Tx board is mounted onto the sub-chassis. A rectangular hole in the board allows the IRF511 to be positioned so that excess heat is sunk directly into the chassis. Fit insulating hardware at the interface. The drain and gate pins must clear the board. A small solder tag under the mounting nut provides the drain connection. Check that there is room for the VFO assembly to be fitted without touching the head of the screw which secures the IRF511.

I wanted to keep the band switching method as simple as reasonably possible. We only need two "positions" for our two bands. The perceived choices include wafer switches (messy, not readily available in some places), relays (bit complex, clunky and costly), diodes (added complexity, bit lossy, may introduce cross-modulation problems), and ordinary slide switches. The slide switches won out. They are cheap, quite reliable, not too lossy (at HF), readily available, and lend themselves to a simplification of the task in hand.

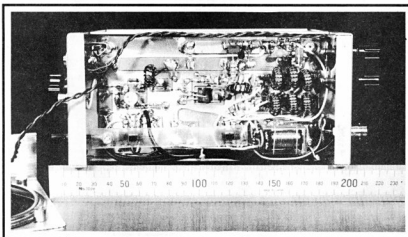
Each of two DPDT slider switches is mounted upon a substrate board in a similar style as for the ICs. The layout shows them mounted in-line. A length of perspex (or similar) has two square or

and re-tweak the 55 pF for max signal. Now, carefully adjust the 500 ohm trim pot around mid range. You should see a tiny dip as the 3.5 MHz component is balanced out. Can't see it? Leave the blade in the 7 MHz output, and tune your receiver to 3.5 MHz (VFO cover in place). Again adjust the balance pot for a pronounced null in the received signal, which must not be too strong, or the null will be masked.

The receiver board may be tackled next. A board size of 75 mm x 150 mm is suggested. For ease of working, the four ICs should be inserted into wire-wrap sockets which, in turn, are soldered to home-made substrates. A

suggested layout plan is shown. Each of the input coils has a link coil of three turns in series, which effectively renders them self-supporting. The other input coils may be fixed to the board with a small blob of non-acid silicone glue. Take care soldering the monolithic capacitors – too much heat for too long may unsolder the lead from the chip.

The transmitter board is the same size, and assembly is similar to the receiver. To wind broad-band transformers T2 and T3, take two 300 mm lengths of #24 B&S (0.5 mm) enamelled wire, twist the ends of the pair together, and clamp that end in your vice. Twist the free ends together, then fix in the



**Transmitter board, with speaker removed**



Use ordinary small gauge hook-up wire for connections between the rear slider switch and the output filters. Keep these wires as short as reasonably practicable. The signal connections between the relay and coax antenna connector, and relay to receive input, should be made with miniature 50 ohm coax, or shielded wire as shown. The 3.5 and 7 MHz VFO signals must also be carried via coax.

The following assumes that the VFO/doubler assembly is working correctly as described above. Check

Connect a 50 ohm dummy load/power meter (a 12 V/3 W auto dash lamp will do) to the output. Select 3.5 MHz. Switch to Tx. Adjust the bias pot

On Tx mode, use a DMM to measure the voltage at the junction of the two 1N914s at the VFO RIT input. You should read about 3.5 V. Now switch to receive. Adjust the RIT pot to read exactly the same voltage, then slacken off the knob set-screw and position the knob pointer to a mark at the 12 o'clock position. Transmit and receive frequencies will now be the same when the knob is at 12 o'clock (ie mid pot travel). When first calling another station, tune to "zero-beat", then offset your receive frequency with the RIT pot to obtain a pleasing note above or below zero, depending upon adjacent channel occupancy. When contact has been established, remember to do any receive



frequency adjustments with the RIT, leaving the main VFO control untouched.

## More Information

Some DC and RF voltages are shown on the circuit to aid in any necessary trouble shooting. These were measured using a DMM, and diode RF probe. A measured value which differs greatly should indicate the problem area. If, after earnest efforts, you cannot make your model work satisfactorily, or you require more information, please write to me at the address below, and any reasonable amount of assistance will be gladly returned. An SASE would be appreciated.

## References and Further Reading

1. *Direct Conversion CW Transceivers* – Price G4BWE, *Rad Comm Jan '86* (excellent).
2. *A QRP CW Transceiver for Experimenters* – Price, *Rad Com Feb, Mar '94*.
3. *The "Queensbury" 7 MHz CW Transceiver* – Ortmayer G4RAW, *PW, July '93*.
4. *A Portable QRP CW Transceiver* – Breed K9AY, *QST, Dec '90, Jan '91*.
5. *A Simple Direct Conversion Transceiver* – Kreuter WA3ENK, *HR (USA) Dec '88*.
6. *40 Metres in a Nutshell* – Nouel KG5B, *73 Mag, Mar '87*.
7. *"Paddyboard" Circuit Construction* – Diamond, *AR, Feb '95*

\*45 Gatters Road, Wonga Park VIC 3115

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## Parts List

Capacitors	Qty
3.9 pF NP0 ceramic	2
12 pF NP0 ceramic	2
18 pF NP0 ceramic	1
20 pF air variable	1
25 pF "beehive" trim cap	1
55 pF compression mica	5
82 pF NP0 ceramic	2
100 pF polystyrene or NP0 ceramic	2
150 pF polystyrene	3
180 pF ceramic	1
220 pF polystyrene (ceramic 2nd choice)	4
820 pF polystyrene (ceramic 2nd choice)	4
1000 pF feedthrough	2
1800 pF monolithic or greencap	2
3300 pF monolithic or ceramic	7
0.1 µF monolithic	30
0.22 µF monolithic	1
1 µF electrolytic or tantalum	1
2.2 µF electrolytic or tantalum	1
10 µF electrolytic or tantalum	3
33 µF tantalum	1
100 µF electrolytic	2
Resistors	
1 ohm 1/4 W	1
4.7 ohm 1/4 W	1
10 ohm 1/4 W	5
56 ohm 1/4 W	1
68 ohm 1/4 W	1

## Parts List

	Qty
100 ohm 1/4 W	2
270 ohm 1/4 W	1
470 ohm 1/4 W	2
500 ohm flat mount trim pot	1
1 560 ohm 1/4 W	1
820 ohm 1/4 W	1
1 kohm miniature linear pot	1
1.2 kohm 1/4 W	1
1.5 kohm 1/4 W	2
2.2 kohm 1/4 W	2
5 kohm flat mount trim pot	1
8.2 kohm 1/4 W	1
10 kohm 1/4 W	5
50 kohm miniature log pot	1
100 kohm 1/4 W	1
220 kohm 1/4 W	2
Semiconductors	
MPF 102, 2N5457 etc	1
2N2222, 2N3904 etc.	4
2N3053, BFY50 etc	1
2N3906, 2N3638, 2N3645 etc	1
1N914, 1N4148 diode	3
6.8 or 6.2 V 400 mW zener	2
1 A diode	1
NE602AN	2
LM741	1
LM386	1
7805 positive 5 V chip	2

## Miscellaneous

Box to suit, or aluminium to make, box for VFO; about 120 mm long x 80 mm wide x 55 mm high, circuit board material and scraps for pads, wire-wrap IC sockets (4), Amidon T50-6 red toroidal cores (11), FT50-43 cores (3), #22, 24, 26 28 B&S winding wire, hook-up wire, miniature coax or shielded wire, 12 V relay with two sets of C/O contacts, DPDT slider switches (2), perspex for push-pull rod, SPST switch, 12 V DC terminal set, coax connector, RCA type sockets (2), RCA plugs (the cheap kind, 2), key jack, phone jack, speaker, insulating hardware for IRF511, vernier dial, knobs, screws, nuts, solder, etc.

## WIA News

### ARRL to Revamp DXCC

The American Radio Relay League (ARRL) has appointed a committee to review the DX Century Club (DXCC) program and recommend changes to the League.

An ARRL Division Director, John Kanode N4MM, has been appointed chairman, according to an ARRL Letter report. Also appointed were Larry Price W4RA, Rick Roderisk

K5UR, Jim Maxwell W6CF, Walt Stinson W0CP, Garth Hamilton VE3HO, Bob Winn W5KNE, Bill Kenamer K5FUV, Wayne Mills N7NG and Chuck Hutchinson K8CH. It is unofficially known as the DXCC 2000 committee, reflecting the goal to have any changes to the program in place by the year 2000.

The ARRL Board of Directors, in setting out the committee's terms of reference, asked the committee to recommend changes necessary to "encourage broader participation by more amateurs, make the program

more equitable, create better understood criteria for DXCC countries, improve the process of reviewing requests for additions and deletions to the ARRL DXCC List and increase efficiency in the administration of the program."

There are no plans to scrap the DXCC program, assured the ARRL DXCC manager, Bill Kenamer K5FUV, who is also on the committee. Country credits from the present DXCC program will continue to count regardless of what other changes might occur, he said.

## ■ Antennas

# The VK4FUQ Two Metre "Strip" Yagis

*Felix Scerri\* suggests another method of building Yagi beam antennas.*

For those interested in antenna home-brewing, I would like to present these two somewhat novel small Yagis for the two metre amateur band.

### Design

They are novel in that they make use of aluminium strip instead of the usual tubing. This allows very simple construction with rapid assembly and disassembly possible. Thus, they are ideal for portable and emergency use. I designed both Yagis several years ago, and both have been thoroughly tested on air. Yes, they work quite well.

The use of "strip" type elements is interesting electrically, as the length/diameter ratio of this material is quite different from tubing. The "boom effect" necessitates a considerable shortening in individual element lengths. Not being very mathematical, I have not been able to arrive at a length formula but, as a result of heaps of empirical adjustment, I have arrived at the lengths and spacings shown. All the elements show some shortening, except for the reflector, which did not appear to be overly critical in tuning.

The designs were optimised for 146.7 MHz and the SWR bandwidth is quite narrow. The old "quarter of an inch per MHz" rule could be used to shift the coverage range but, I have to admit, I haven't tried it.

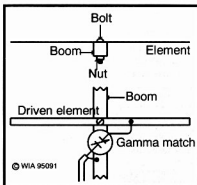
### Construction

Construction overall is very simple, with the gamma matching unit possibly being the hardest part. I used a mica compression trimmer in conjunction with a gamma wire tapped out at five and a half inches (140 mm) from the boom centre. I soldered this wire to a small bolt and nut mounted through a small hole in the driven element. Follow all the usual rules when matching to a 50 ohm feedline.

The combination of the specified element and boom materials results in a strong and lightweight assembly. A square should be used to ensure that the elements are mounted properly at 90 degrees to the boom (they look terrible otherwise!). There really isn't too much to it. Mounting on a mast is easily done with a few appropriate holes through the boom and U-bolts.

### Yagi Design

Finally, a few words on Yagi design. Here, there are many "schools of thought". These antennas were designed through direct field strength measurement at a specific design frequency. It is interesting to note that, when final designs were analysed, I found close agreement with the guidelines published by Carl Greenblum many years ago. Note, also, that both designs are quite short in terms of boom length.



**Figure 1 - Upper drawing shows mounting of elements to boom. Lower drawing shows matching feedline to the driven element (drawings not to scale). The co-ax braid is fastened to the boom, the inner to a compression trimmer of about 47 pF. The gamma tap is 5.5 inches (140 mm) from the boom centre. Adjust the gamma capacitor and wire spacing for the lowest SWR. Enclose the trimmer capacitor in a plastic bottle top for protection from rain, etc.**

Apart from reasons to do with portability and size, there is another reason, something I call "One Wavelength Uncertainty Principle". It is almost the Yagi version of the "Heisenberg Uncertainty Principle" from the world of quantum mechanics. In my experience, the design optimisation appears to become quite uncertain and difficult to measure as boom length passes one wavelength!

Even the professionals have found this; however, things are getting better. Thanks to the efforts of DL6WU, K1FO, VK3AUU and others, long Yagi design is now much more certain than in the past.

The designs formulated by the then National Bureau of Standards were often touted as "maximum gain" designs. However, having built a few NBS designs in my early days, I found them to be, putting it kindly, incredibly mediocre. But enough of that. I guess others might disagree.

If nothing else, I have found that with Yagis, element (director) tuning is everything. It is my feeling that non-optimum tuning is mainly responsible for lacklustre performance. Yes, it is all very interesting, if rather complex.

Anyway, here are two more designs for you to try.

## Design and Construction Data

### Element lengths

Reflector	40.25 inches	(1020 mm)
Driven element	38.0 inches	(965 mm)
Directors	35.5 inches	(900 mm)

### Element material

20 x 1.6 mm aluminium strip

### Boom material

19 mm box tubing

### Spacings

#### 3 element

R to De	16.125 inches	(410 mm)
De to D1	14.5 inches	(370 mm)

#### 5 element

R to De	12.75 inches	(325 mm)
De to D1	11.25 inches	(285 mm)
D1 to D2	14.0 inches	(355 mm)
D2 to D3	19.25 inches	(490 mm)

Elements mount on boom with 25 mm "roofing bolts" (about 3 mm thick) - see Figure 1. (Preferably two per element. Tech Ed)

\*9 Garbutt Street, Ingham QLD 4850

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## ■ Equipment Review

# Yaesu FT-51R Dual Band Handheld Transceiver

*Reviewed by Ron Fisher VK3OM\**

It's been quite a while since I have done a VHF/UHF review. This one came along at just the right time; I happened to call in at the Federal Office to drop off some material for the magazine the day before setting off for a three week trip to New Zealand. Would I be interested in looking at a new dual band handheld? Seeing that I was ready to pack two transceivers, one for two metres, the other for 70 cm, how could I refuse the offer of just taking the one, and a new

one at that. So, the FT 51R has been tested over many hundreds of kilometres of New Zealand roads.

If you are planning a trip to ZL, it is essential to have 70 cm as well as two metres. On 70 cm, they have an incredible system of linked repeaters that covers the whole country from north to south. From Christchurch in the South Island I could easily talk to my friends in Auckland.

Well, enough of that, what about the

FT-51R? The FT-51R is, in fact, the big brother of the diminutive FT-11R two metre handheld transceiver. When I say "big brother", I don't mean big in size but big on features. The FT-51R features both two metre and 70 cm operation with simultaneous dual band receive capability and extended range receive coverage, including the aircraft band with AM detection. All of this in a package only 5.8 cm wide, 12 cm high and 3 cm deep which includes the two watt output battery. The higher power output batteries increase the height a small amount.

The transceiver is supplied with an antenna, nicad battery and an Australian approved charger. The supplied battery gives the transceiver two watts power output. Optional batteries allow up to five watts output.

Perhaps the most interesting feature of the FT-51R is the scrolling instructions built into the larger-than-usual LCD. Yaesu call this feature "windows". Not quite the same as the "Windows" you might find on your

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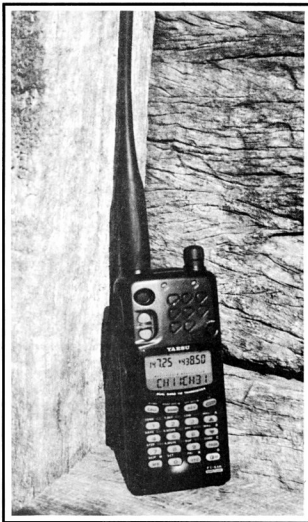
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IBM clone computer, but more "windows" into the works of the FT-51R that will help you sort out the very friendly operating options that the rig presents. The amount of information that the display delivers is quite amazing. Let's run through a few of its features.

The spectrum scope gives a visual picture of what is going on on frequencies other than the one you are actually using. If a frequency becomes active, you just have to centre the "pip" in the display using the tuning control and you are there. Of course, the two operating frequencies displayed on the readout are capable of receiving two signals at the same time, either on the same band or on different bands. As well, each frequency has its own "S" meter and if you decide to change either the audio gain or the squelch, this is also displayed by a bar graph. Transmit power output is also displayed as a bar graph. The display will even tell you which battery you have fitted (in case you have forgotten!) and its present state of charge. Both the receive audio gain and squelch settings are set using up/down buttons, with audio being the primary function and the squelch selected via the "F" (function) button. In fact, the only rotary control on the transceiver is the VFO/memory selector on the top panel. Each of the twenty control buttons below the display have dual functions selected via the "F" button.

## On the Air

With the rush to get away on our holiday, the first chance I had to read the instruction book was on the plane on the way to Auckland. Unfortunately, I wasn't able to have the FT-51R in front of me while doing this. The Yaesu looks just like a cellular phone and airline staff are paranoid about using these while in the air. However, by arrival time I was



sure that I would be able to call my ZL friend on our pre-arranged 70 cm frequency. I did and got through the first time.

The first thing I noted was that the audio output from the speaker was lacking when using the rig in a high ambient noise area. It was really better to treat the transceiver as a mobile phone and hold it up to your ear. Depending on how quiet your car is, an external speaker could be an advantage. But, for normal use around the house, there was plenty of audio.

The received audio quality was very good considering the speaker is only about 25 mm in diameter. Reports on the transmitted audio quality were excellent, indicating a well balanced

response and optimum deviation. I also tested the audio with the MH-12 speaker microphone. Transmit quality was identical to the inbuilt microphone with the received audio slightly more restricted than the internal speaker. Acoustic output was slightly less from the external unit.

The MH-12 is now an old model and I note that Yaesu now offer three optional speaker microphones. There is the MH-32A2B which is a miniature size model, the MH-35A2B standard size model which, no doubt, replaces the MH-12, and the super model, the MH-29A2B which has its own inbuilt digital display and control buttons. None of these were supplied with our review transceiver so, unfortunately, I cannot comment on their relative performance. I would be most interested to test these three units, in particular the remote control model with the inbuilt display, some time in the future. Dick Smith Electronics please note.

Transmitter power output was measured at 2.3 watts on 146 MHz and 1.5 watts on 435 MHz. The antenna that

Yaesu supply with the FT-51R is a new design which is claimed to give better performance than some of the usual rubber dummy loads. I took along a Diamond RH-77 which, although twice the length of the Yaesu antenna, did not appear to work any better.

There are also three optional battery packs which give the choice of either longer battery life or higher transmit power output. The FNB-38 9.6 volt battery gives the FT-51R a power output of 5 watts. There is no provision to power the FT-51R directly from a standard car battery for mobile operation. The transceiver is rated for a maximum of 11 volts input, not 12, and certainly not 13.8 volts. If you do need to use the rig in your car, you will need the Yaesu E-DC-12 mobile power

adaptor which gives a regulated output of 11 volts to both power the transceiver and also trickle charge the battery. The E-DC-12 terminates in a special fitting that clips onto the battery fitted to the transceiver.

For home use, the FT-51R is supplied with a very neat base charging stand and a wall plug-pack to supply the required charging voltage. This plug-pack has been modified by Dick Smith staff to give the correct charging current. This all works well, with one exception. There is no LED on the charging stand to show that charging is actually taking place. The old CA-2 stand that I use with my FT-23 and FT-411 does have an LED which is very reassuring. Also, both of the adaptors use a 2.5 mm audio plug for the DC connection which can accidentally short the DC supply unless they are pushed in with care. A proper DC connector should have been used.

### The Bottom Line

If you are in the market for a dual band handheld transceiver, the Yaesu FT-51R should be near the top of your list. I have always thought that Yaesu handhelds are more user-friendly than many other makes. The wide band receiver has excellent sensitivity right across the range. It is especially good on the aircraft band and actually ran rings around two dedicated air band receivers that I use from home. I note from American advertisements for the FT-51R that Yaesu can supply a software program to operate your transceiver from your PC. If available here, this could be a most interesting addition to your transceiver.

The review FT-51R was supplied by Dick Smith Electronics to whom you should address your enquiries. The FT-51R sells for \$899 and this includes a 4.8 volt rechargeable battery, base charging stand and wall plug charger.

\*24 Sugarloaf Road, Beaconsfield Upper VIC 3808

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## WIA News

### Antenna Design to Deflect Mobile Telephone Radiation Fears?

Amid speculation and controversy over whether or not radio-frequency radiation from handheld mobile phones causes cancer in some users, engineers from the Queensland Griffith University claim to have successfully designed an antenna for mobile phones that deflects the electromagnetic radiation away from the phone user's head.

Recent media reports have kept alive fears that the radio-frequency radiation from mobile phones may cause brain or other cancers. Recent scientific studies on a possible link between mobile phone use and cancers in users have been inconclusive on the matter of causality, or the likely mechanism if low level radio-frequency radiation is linked to cancer.

After four years of work, the university engineers said their antenna reduces the exposure level to only 0.1% of that currently experienced when using today's mobile phones. In addition, they said the antenna leads to an increase in battery life of more than 70% and the phone's range by 50%.

The Griffith University is seeking a manufacturer to produce the antenna so that it can be sold worldwide.

The Australian Standard AS 2772 presently applies to RF exposure limits from radio-frequency devices, including mobile phones. For those concerned about the health implications of radio-frequency radiation, two very clearly written articles are recommended: "Are Radio Waves Dangerous To Your Health?", and "Does Your Station Comply With RF Field Limit Standards?", written by Andrew Corney ZL2BBJ and published in the NZART journal Break-In, November and December issues 1995, respectively.

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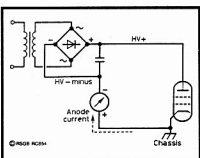
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## ■ Technical

# Technical Abstracts

Gil Sones VK3AUI\*



**Figure 1 – Skeleton circuit of HV Supply for Grounded Cathode Amplifier.**

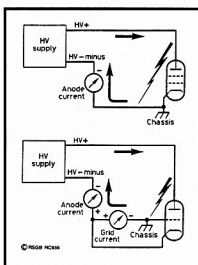
### Flashover Protection

Flashovers in valve linear amplifiers can occur and may result in major and expensive damage. The interlock which grounds the high voltage when you open the high voltage cage may keep you alive but the flash may signal an expensive repair. In *RadCom* January and February 1996 issues, Ian White G3SEK, in his *In Practice* column, explains how the problem can arise and how to avoid major damage.

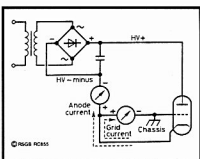
In Fig 1 and Fig 2 the skeleton circuits of both grounded cathode and grounded grid amplifiers are shown. These are only skeleton circuits and there are many parts omitted, several of which are safety related. The metering is shown in the negative lead as this is standard practice. The use of meters in the HV

lead can result in insulation and safety problems and is usually avoided.

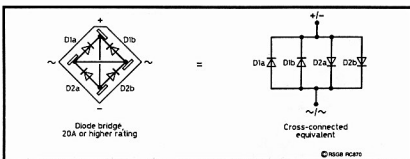
The current path in the case of a flashover is shown in Fig 3. This is also the case for the operation of the grounding interlock on the HV cage. The current is quite large as it passes through the delicate meters and it also results in the HV minus rail being forced a long way negative with respect to the chassis ground. This can result in expensive damage to the meters and a potentially dangerous situation with the HV minus rail.



**Figure 3 – Effect of Flashover from Anode to Chassis .**



**Figure 2 – Skeleton circuit of HV Supply for Grounded Grid Amplifier.**



**Figure 4 – High Current Bridge cross connected as High Current Protection Diode.**

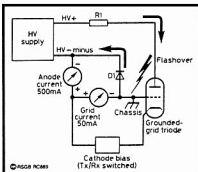
The current present in this situation is very large. The usual capacitor block contains a lot of energy which is dissipated very quickly. To limit the current a resistor should be incorporated between the HV capacitor block and the site of potential shorts. This is between the capacitor and the shorting switch and the PA valve circuitry. The shorting switch is normally held open by the lid of the cage and it is intended to keep you alive if you open the cage.

The current limiting resistor should have a relatively small resistance of the order of 50 ohms and should be capable of withstanding the surge. A metal clad wire-wound resistor of 50 to 100 watt rating would be suitable. You can obtain these from a few suppliers. RS or Farnell should be able to help. The resistor won't need a heatsink but should be given a well insulated mounting. This will limit the current in a flashover to a manageable value. The meters still need protection though.

A couple of back-to-back diodes with adequate surge ratings will protect the meters. They can be provided by one of the high current encapsulated bridges cross connected as shown in Fig 4. There are many 25 and 35 amp bridges available which have quite large surge current ratings and they are relatively cheap. The rating may appear excessive, but remember that 2500 volts through 50 ohms gives 50 amps.

The resultant protected circuit is shown in Fig 5 with the flashover current path. The meters are protected and the HV minus rail is kept close to chassis potential. The normal meter operating potential drop is less than the forward diode voltage and so meter operation should not be affected. The





**Figure 5 – Grounded Grid Amplifier with protection diode and resistor showing Flashover Current Path. Meters protected and HV minus rail close to chassis potential.**

resistor limits the flashover current to a manageable value. The damage should be minimal in the event of a flashover.

There should also be fuses between the HV transformer secondary and the HV rectifiers. These should be special HV fuses. The glass encapsulated types intended for low voltage use are not recommended as they can shatter sending rather nasty shrapnel into the surroundings. They also produce an arc

when they rupture which can last for long enough to do a lot of damage. You need a fuse which can contain and snuff out the HV arc. You can obtain suitable fuses but it does take some work to find them.

## Frequency Checking

Most modern transceivers have a very impressive frequency readout but it may differ from the actual frequency of transmission and reception by a significant amount. The readout is usually not a measurement of the actual frequency but represents the frequency setting of the computer controlling the radio. The actual accuracy depends on the accuracy of the oscillators used to generate the signal. These may not be as precise as we may desire. Some radios are fitted with a very accurate TCXO but most have lesser specifications.

The readout may well be 100 or even 200 Hz in error. It is possible to determine the error fairly simply. In *CQDL* for August 1995, Peter Bobeck DJ8WL explained how to check transceiver frequency using an accurate tone source. My thanks to Mike

Krochmal VK3KRO/VK3ZIP for providing a translation of the article.

An accurate tone source is needed and this is provided by dividing the frequency of a crystal oscillator. A CMOS divider providing a divide by 4096 is used. A readily available crystal is divided to give a tone of 600, 800, or 900 Hz which is within one Hertz. The crystals are readily and cheaply available as they are used in a variety of common equipment. The circuit is given in Figure 7. The square wave output of the divider is cleaned up by an active filter to provide a sine wave output.

The tone source is used either to determine a transmitted frequency or to check the received frequency. For checking the transmitted frequency a counter with sufficient accuracy is needed. One part per million is an error of one Hertz per MHz.

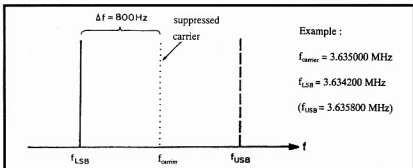
To check the transmitter frequency, the audio source is fed into the microphone input and the output frequency of the transmitter is measured with a counter. The frequency of the suppressed carrier can be determined by adding or subtracting the tone frequency depending on whether the signal is LSB or USB respectively (see Figure 6). You should, of course, use a dummy load for this test.

For a received frequency test you need a known carrier to tune to. You tune to obtain a beat note which is of the same frequency or pitch as the audio tone source. The ear is very sensitive to pitch and the tone from the generator and the receiver will audibly beat when they are close in frequency. Then, knowing the frequency of the signal and the frequency of your audio tone, you can calculate the suppressed carrier injection frequency and check your dial reading. One of the standard frequency stations will provide a suitable signal. Alternatively, some other known signal can be used.

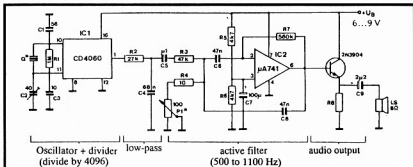
You can, of course, note the frequency error and, if you are able, you could, of course, adjust the transceiver master oscillator. However, the simplest course is to note the error and bear it in mind when an accurate frequency setting is required.

\*C/O PO Box 2175, Caulfield Junction VIC 3161

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**Figure 6 – Frequency scheme.**



## ■ Book Review

# The ARRL Antenna Compendium

## Volumes 1, 2, 3 & 4

**Publisher:** ARRL

**Reviewed by:** Evan Jarman VK3ANI

*Paperback 278 mm by 210 mm*

*Volume 1 (1985) 176 pages*

*ISBN 0-87259-019-4*

*Volume 2 (1989) 212 pages*

*ISBN 0-872259-254-5*

*Volume 3 (1992) 238 pages*

*ISBN 0-872259-401-7*

*Volume 4 (1995) 216 pages plus 720 K IBM/C disk*

*ISBN 0-872259-491-2*

The perils of being a publisher! What can you do when the articles on antenna construction offered for publication grossly exceed the available space in your magazine? One has to balance content among the various facets of the hobby. The problem, if that is what it can be called, is that amateurs love antennas. They are the one area common to all activity. They can be fabricated and modified in the garage; and are the last bastion of home brew. They, more than any other component, determine the effectiveness of a station. Obviously, they are the most popular subject.

Because of the antenna's popularity, the publishers of *QST* have a plethora of

antenna articles. The ARRL decided to publish "The ARRL Antenna Compendium: Volume 1" in 1985 to provide the space that the magazine could not. The popularity of articles on antennas has led to subsequent volumes being published, the most recent being volume 4.

Each volume is a collection of articles on antennas. They have been grouped so articles on similar subjects appear together. This approach has been adhered to in all four volumes. Some of the articles are specialised and go into a fair bit of theory, often more than general interest dictates. Others keep the theory to showing how designing is

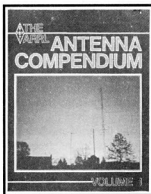
tackled. In this field the growth of PCs as a design aid becomes obvious. In volumes 2 and 3, the programs are published as text (available on disk). With volume 4 a disk is included.

These are not definitive reference books. They are not the books to refer to when a general explanation is required. They are books that show how others have tackled various problems. Most show the progression through theory to construction. The subject range is very diverse, many with very creative solutions. There is even an article on theory that went wrong which includes the "why". The largest I saw was a 9 element beam for 80 metres on a 100 metre boom. The smallest was a 2 metre mobile that you had to struggle to see in the photograph, even when pointed out. Antenna related equipment is also covered, such as rotators, mountings and transmission lines. A few articles on propagation are included as well.

Most frequencies are covered by the articles, diverging from the conventional textbook design. Articles on antennas above UHF are, however, rare. There are some very innovative articles included. Much hard work has obviously gone into these articles and software. Some rare articles have been published elsewhere, but not in *QST*. The classic G5RV article in volume 1 has appeared in many magazines, *Amateur Radio* included.

It is understatement to say that these volumes are a good source of ideas. With over 150 articles within the 4 volumes, there must an idea or ten for even the most knowledgeable.

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# ■ Operating Incident at Tarawa

*W A ("Blue") Easterling VK4BBL\* tells how his regular 20 m sked with a few VK friends suddenly became a focus of international official communications.*

During the second week of October 1995, amateur radio was again to show its usefulness during a telecommunications major failure in mid-Pacific when a severe mishap put the satellite dish out of action at Tarawa.

Tarawa is the capital of the Republic of Kiribati which old timers will remember as the Gilbert and Ellice Islands colony, achieving full independence in 1979. Its land area is comparatively small but spread over 33 coral atolls in an ocean area of five million square kilometres. It extends 3870 km from west to east and 2050 km from north to south. There are three major island groups, the Gilberts in the west and the Phoenix and Line Islands to the east. Tarawa is one of the Gilbert group.

In 1984 communications were upgraded with the installation of a satellite earth station at Tarawa providing fax and telephone links to the outside world. It worked satisfactorily until 8 October 1995 when, after a planned outage, a mechanical failure caused the dish to turn out of control and hit a nearby building. Both the dish and the waveguide were badly damaged.

## Help!

Next morning we had a breaker call into our little group on 14130 kHz. He was David T30DW on Tarawa asking if we could relay a rush message to Peter Dalton at Telstra in Sydney. He picked a good group to contact; almost all of us are former OTC staffers.

John VK2ALJ, ex ABC Senior Tech, tried in Sydney but found little information in the telephone book. I took the message, intending to have Brisbane Radio/VIB relay through the internal network; however, it was decided to pass it to Peter direct. Another stroke of luck. Peter is VK1XP, spent some time on Tarawa on secondment, and knew the gear and people so no explanations were needed.

He suggested activating an INMARSET set at the Fisheries Depart-

ment, but this had been unserviceable for some time. Therefore, David T30DW and I kept skeds during the next few days. David is the General Manager of the Bank of Kiribati, formerly with Westpac and, as I was a "Wales" teller in bygone years, we were on common ground even if most of my working life was in Coastal Radio with OTC.

Next morning he sent a message saying that further checking revealed even worse mechanical damage and again asking for urgent assistance to restore international communications. Tarawa had no spares and no chance for a quick fix.

## WICEN

David also had a welfare message and asked if WICEN could handle it and any others that might be offered. Brian Mennis VK4XS, the local WICEN Coordinator, responded immediately and lined up some of his members. He advised the local SMA office of the situation only to find that Australia has no third party agreement with Kiribati. After ascertaining the authenticity of the matter, the gentleman at the SMA suggested that if the Republic made an official request, a temporary permit would most likely follow.

So, next morning, Thursday, 12 October, I reported this to David along with the cheering news that an RAAF Hercules aircraft would depart Richmond NSW with a complete new installation and two Telstra technicians on Saturday, 14 October.

It was then found that the Australian High Commission there had a link with Canberra, technical details unknown, but obviously not open for public correspondence. An inter-Governmental message was sent and the third party permit was issued the same day.

Radio conditions the next day were poor. There had been sunspot activity the previous day and no contact on Saturday. On Sunday, David was back with his usual 599 signal, advising that a power blackout had kept him off the air (his

home diesel plant gives out too much QRM for radio work).

## Relief

The Hercules arrived at 6 pm Saturday and most of Tarawa was there to see the monster aircraft. The Telstra technicians had brought a SATPHONE with them and could dial back to anywhere. They hoped to restore full service by the following Thursday.

David obtained a local permit to open a commercial circuit with Suva on 14365 kHz, outside the amateur band but within the tuning range of his gear and beam. Kiribati is not wealthy, with much of its income deriving from the wages of its young men crewing foreign ships. It was essential that the Bank remain in contact with a bank in Suva acting as an agent during the emergency, so David was a very busy man.

It was fortuitous that T30DW made his contact with a group who knew the ropes of the international aspect and which speeded the process. However, I know that any amateur would have responded to his initial request.

\*8 Penguin Waters, Burleigh Heads, QLD 4220

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160M vert top loaded	\$327
6 M coilin 6 dbd rad 4.NEW	\$157
6 ele 6 M N.B.S 50 mm Boom	\$310
Duo 10-15 M	\$295
3 ele 15 M	\$199
3 ele 20 M	\$333
20 m log-yag array 11.5 dbd	\$755
M B Vert NO TRAPS 10-80 M	\$275
Tri band beam HB 35 C 5 ele	\$690
40 M linear loaded 2 ele	\$516
13-30 M logperiodic 7 ele 7.62 Boom	
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## ■ People

# Two Friends, a Cat and a Classic Wooden Boat

## Plus that vital ingredient – Ham Radio!

*Maxine Godley\*, a non-amateur, tells of her enthusiasm for the communication wonders of ham radio.*



**Jill Knight VK3CMF, "Fletcher" and "COOEE".**

Bob and Betty Neilson, VK4AAU and VK4WAM, agreed to help me so I could pass on important information and make arrangements to welcome Jill in New Caledonia. The 20 metre band has notoriously poor propagation at present and this was Jill's preferred frequency. Bob had not used this band for years but "dusted it off" and gave it a go. The first contact was pretty awful and Bob suspected a defect "up the pole". Between scheduled contacts Bob tackled the problem with soldering iron, nuts and bolts – the whole thing being reassembled as Jill was calling us. Bob completed repairs, we raced to the radio just in time, and the signal was excellent.

Not only did I want to visit Jill as she waited for the westerlies to subside in Noumea, but communication was under way in Brisbane to import "Fletcher",

Jill's cat who has been her only companion for so long. She was not able to communicate closely enough with Australia's Quarantine Service whilst sailing, and it seemed that her only option would be to find a home for Fletcher in Noumea, thereby farewelling her little friend. It's not common for yachts to arrive in Brisbane with an animal on board for import, so a lot of information had to be collated to assist the Quarantine authorities to make this most important decision.

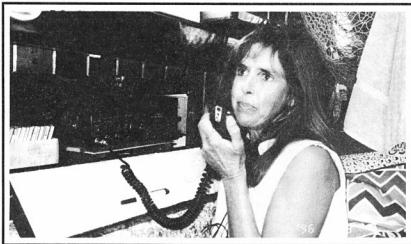
Sunday morning became the regular contact day for me and my partner, John, with Bob and Betty welcoming us in the front garden and proceeding upstairs to the set. It was always exciting for me to speak to my dear friend of 30 years and to know that we could help her in such a practical way through the ham radio network.

During the first few contacts I was almost in tears to hear Jill's voice so clearly after so many years of letters to her all around the world.

Bob spent a lot of time perfecting the contact each week; shifting to different frequencies, tuning and twiddling a multitude of knobs and buttons.

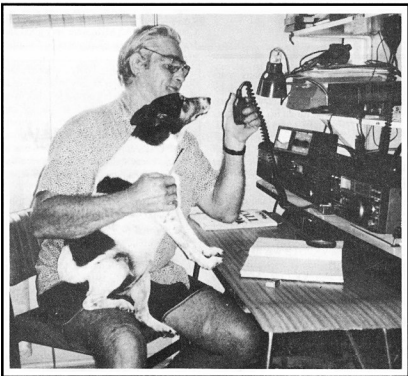
Alan McCaskill, a good friend of the Neilsons, also took a close interest and communicated from his station VK4SKL in Alligator Creek near Mackay.

Sunday after Sunday went by with Jill sailing closer and with me arranging for leave from my job, airline bookings,



**Jill VK3CMF operating her IC-737 on board "COOEE". Jill uses a half wave dipole antenna for 20 m, and an Outbacker mounted on and earthed to the life lines on the boat.**

A Mackay ham radio operator provided a valuable link when I wanted to make contact with my best friend, solo sailor Jill Knight VK3CMF on the historic yacht "COOEE". We had not seen each other for nine years as she sailed around the world. Jill was in mid-Pacific in August, heading for Tahiti, Suva and Noumea, her last landfall prior to returning home to Brisbane.



**Bob Neilson VK4AAU, and second operator, at the station he shares with his wife Betty VK4WAM.**

new sailing charts for Jill's entry to Brisbane, finalising details with Quarantine and a multitude of other duties.

Soon I was on the plane and what a joyful reunion it was at Noumea airport. The airport bus dropped us in total darkness near the bay and we made our way down a dark embankment, through long grass to the dinghy, and out to yacht "COOEE".

Next morning I felt slightly disoriented as I spoke to Bob and John from Jill's maritime mobile station.

Fletcher had been unexpectedly quarantined in Noumea for five days and this really threw a spanner into my careful negotiations. John was able to take over with my Brisbane Quarantine contact while I worked with Jill to execute a mountain of new certificates, authorisations and clearances, fighting a new battle to regain the hard-won minimum quarantine period of 30 days.

In between all this Jill, Fletcher and I enjoyed the best of isolated islands, blue-green water and white sand and caught up on some of those nine years.

It was a sad return to Australia after

three weeks, this time to prepare for Jill's imminent return. "COOEE" is 102 years old and possibly the oldest boat to have completed a circumnavigation. 14 metres overall, this New Zealand-built classic wooden, gaff-rigged tops'l cutter was built for bay and harbour racing. Jill had it modified to sail it alone and, in completing a circumnavigation, proved it a solid, secure design. It was a remarkable feat over seven years - full of danger, endurance and wonderful adventure.

Her yacht club - Mooloolaba in Queensland - met her with a flotilla of sail and motor boats and the media warmly welcomed her and Fletcher on TV, radio and in print. Fletcher was granted her minimum 30 days in quarantine and much of this certainly never could have been accomplished without the network of ham radio - but more particularly, the kindness and perseverance of Bob and Betty Neilson in Mackay - WE NEVER STOP THANKING THEM!

\*C/o PO Box 2175, Caulfield Junction VIC 3161

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# ALARA

Sally Grattidge VK4SHE\*, ALARA Publicity Officer

## Congratulations

Debbie VK5JDM (ALARA Historian) is now VK5DEB. Angela VK3MDA is now VK3FAS.

## Perth

ALARAMeet 1996, to be held on 28-29 September, is rushing towards us; so, if you plan to go, please let Bev VK6DE know ASAP. The tally at the time of writing (April) was 52 adults and five children. Bev needs numbers so that she can finalise bookings for tours, etc. Contact Bev if you need to know the prices for children. The meet coincides with the Royal Show and school holidays, so do not leave your bookings until the last minute or you may miss out. Non-members are also welcome to join in all or part of the weekend. YLs who are planning to be in or near Perth at the end of September contact Bev (see below) if you wish to join any of the pre-booked activities.

For those staying on for the Monday, which is a public holiday, a trip to Mundaring Weir in the Darling Range is being organised with lunch at the lake; sounds a great way to relax and finish all the conversations you started at the weekend. There could even be a trip to Rottnest Island on the Tuesday. After that, you are on your own; let poor Bev have her nervous breakdown in peace!

Costs and details are in the April Newsletter, or contact Bev Hebiton VK6DE, PO Box 299, Geraldton WA 6530. Many of us in areas with few ALARA members would hesitate to take on the task of organising a meet, but dauntless Bev has met the challenge, even doing it by remote control as Geraldton is some distance from Perth. She is going to be a hard act to follow.

PS. Don't forget the "Special Event". All members can participate, even if not able to attend the meet. Read the July Newsletter to find out what this means!

## History

Last year a call was put out to early YLs to tell their stories, and these have now been assembled in a file for ALARA's records, with copies sent to the WIA Federal Historian for publication at some future date. This project is ongoing and stories, papers, photographs, etc relating to early YLs are always welcome; send to the President, Secretary or Historian.

This information was supplied by Bron VK3DYF who has been ALARA secretary

for four years and Editor for many years before that. Bron is stepping down and, by this time, we should have a new secretary. Many thanks to Bron for all her hard work.

## Wyong Field Day

Dot VK2DDB and Margaret VK2MAS presided over the ALARA table at the Central Coast Field Day held at Wyong in February. Beryl VK2BBM and Anne VK4ANN were early visitors and enjoyed looking at Margaret's photographs from her New Zealand trip. Nancy Karas (XYL of John VK2EEH) joined ALARA at the Field Day, and Pauline VK2GTB was there at the WICEN table. Pauline is very active with WICEN in her area. VK2 now has a little mascot doll (it's catching on) complete with miniature radio and callsign VK2MA.

## Sponsorship

Sponsorship is a great way to make contact with YLs in other countries. Here is how it works.

1. You either find a DX YL yourself who would like to become a member of ALARA, and who will, if possible, sponsor you into her home association; or you can ask the Sponsorship Secretary to find a YL you can sponsor. You can even choose a country, city, area if you like.

2. You make contact with the DX YL telling her something about yourself. This contact is usually by letter.

3. Once all is agreed, you forward a year's subscription (\$8.50 covers economy airmail) to the ALARA Treasurer together with the YL's name, callsign and address.

At the time of writing, there were a couple of DX YLs looking for VK ALARA members to sponsor, a VK3 YL was looking for a sponsor in Wales, and some ZL YLs were interested in sponsoring YLs from VK. Contact Gwen VK3DYL.

## Thelma Souper Memorial Contest

Pat Pavey VK3OZ

Having received my copy of the WARO Bulletin from Val ZL2PZ, I made a last

minute decision to try my luck in the Thelma Souper Memorial Contest on 13-14 April. Conditions on 3.5 MHz were very good and I was able to make 63 contacts on Saturday evening.

Encouraged by this, I duly appeared again on Sunday and, after twenty minutes, made the first contact. Being unable to break in on the ZL girls, I selected a frequency and waited for conditions to improve. Fortunately, this strategy was successful as, once the ZLs copied my CQs, they came to me, and every half hour period I received calls from a number of stations for repeat contacts.

This was my first participation in this contest and the decision to enter was only taken on Saturday afternoon but it was a very enjoyable experience. I was made very welcome by the ZL girls who regularly encouraged my efforts, not to mention the OMs, whose contacts far outnumbered the YLs. I was very impressed by the support and enthusiasm from the OMs for this contest and hope to be back again next year.

Well done Pat for persevering to gain a total of 133 contacts. Perhaps this will encourage more VK YLs to have a go next year.

## Prodigal Sue?

Sue, now VK5AYL, was active in amateur TV when she lived in VK2 several years ago. She moved to VK5 in time to attend the Adelaide ALARAMeet, but has been rather quiet since while living in the hills with no antennas to play with. Now we hear she has moved to the plains and married an OM who used to be interested in amateur radio, so we hope she will be back on the air before too long.

## With Bells On

Margaret VK4AOE attended the wedding of her step-granddaughter earlier this year, and Robyn VK4RL's daughter was married in April. Robyn made the dress and did all the make-up for the bride and her attendants, doing their nails the day before. All this on top of starting her own beauty business, so Robyn has not had much spare time to play radios recently.

\*C/o PO Woodstock, QLD 4816

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**Help stamp out stolen equipment –  
keep a record of all your equipment  
serial numbers in a safe place.**

# AMSAT Australia

Bill Magnusson VK3JT\*

## National co-ordinator

Graham Ratcliff VK5AGR

Packet: VK5AGR@VK5WI

## AMSAT Australia:

Control station VK5AGR

Bulletin normally commences at 1000 UTC, or 0900 UTC on Sunday evening depending on daylight saving and propagation. Check-ins commence 15 minutes prior to the bulletin.

Frequencies (again depending on propagation conditions):

Primary 7.064 MHz (usually during summer).

Secondary 3.685 MHz (usually during winter).

Frequencies +/- QRM.

## AMSAT Australia newsletter and software service

The newsletter is published monthly by Graham VK5AGR. Subscription is \$30 for Australia, \$35 for New Zealand and \$40 for other countries by AIR MAIL. It is payable to AMSAT Australia addressed as follows:

AMSAT Australia  
GPO Box 2141  
Adelaide SA 5001

## SUNSAT Launch Date Announced

(From SpaceNews) Reliable sources indicate that the launch date of the SUNSAT satellite has been set for 6 March 1997. SUNSAT is an amateur satellite sponsored by the University of Stellenbosch, in South Africa. SUNSAT's mission will be closely tied in with education. Three school projects have been accepted for inclusion on the satellite's payload so far and, although final preparations are being made to the spacecraft, time still remains for the inclusion of four additional school projects.

One of the more unusual projects riding on SUNSAT is an experiment that will monitor the internal sounds of the spacecraft during the early part of its mission in space. Through this experiment, it should be possible to hear things such as the gravity gradient boom extending and locking into place, "creaking" sounds caused by thermal changes to the spacecraft structure, and sounds from the reaction-wheel assemblies.

Sounds from the spacecraft will be available in real-time through a two metre FM downlink transmitter, and promise to hold a lot of interest.

Do I see some eyebrows raised? SOUNDS in space? How can this be? One can only assume that the audio transducing

device (microphone) is mechanically fixed to the space-frame and works by sound vibration conduction. It will surely be interesting to follow this one through.

## DO-HOP (double-hop) Working Through Amateur Radio Satellites

This is a challenging mode of operation. I'm not sure if any stations have tried it here in VK. Please let me know if you have. It involves working through two satellite transponders in series. It has been possible in the past when some operational satellite transponder input and output frequency bands overlapped. This can be a bit of a nuisance if both satellites are in range and you aren't interested in DO-HOP but, if you are, it can make life very interesting. Several conditions need to be met to have a successful two-way DOHOP contact.

1. The first satellite, let's call it sat-A, must be in range for you.
2. It has to have a downlink passband which at least partly overlaps the uplink passband of the second satellite, sat-B.
3. For a two way contact the satellites have to be operating in "opposite" modes, say B and J modes.
4. The two satellites have to be in mutual range so that their footprints overlap and they can "see" each other over their respective horizons.
5. The station you are hoping to contact must be in range of sat-B.
6. Finally, you need a lot of experience and patience, a pretty good station and a quiet location.

Only on rare occasions will you be able to satisfy all these conditions. You transmit up to sat-A and your signal is re-broadcast and picked up by the receiver of sat-B. It is then down-linked to the other station. The other station takes the reverse route through the two transponders and back to you. Sounds easy? Read on.

The Doppler shift alone is very difficult to predict and cope with when you have two satellites converging on each other and then diverging at speeds of up to tens of thousands of km per hour. It can work in your favour, however. The signals will drift rapidly away from any "transceiver" setup thus minimising the risk of feedback across the system. This means it would be virtually impossible to monitor your own transmission in the way you normally would when working through a single transponder. The mutual footprint of the satellites is most

likely quite small and certainly less than either single footprint at either station. It may only amount to a few minutes.

The conditions are difficult to meet and require a lot of planning and some good tracking software. Many tracking programs will only display one satellite at a time on the screen. James Miller's SATFOOT program is one which will display multiple footprint and would suit this purpose. Some tracking programs will predict mutual satellite co-visibility which would also be useful.

Here is a summary of some recent (1993) European activity from Pat G3IOR which may spur some locals to make the quite considerable effort to try this mode of operation.

## DOHOP Satellite News

Following in the footsteps of Ray Soifer W2RS, who accomplished cross satellite radio contacts using OSCARs 6 and 7 in 1974/5, Pat G3IOR and Dave G4CUO achieved "DOHOP" success with OSCAR-10 to RS-6 on CW on 7 May 1984 at 0711 GMT. After many attempts, they finally made successful contact and also contacted Heinz DL1CF using OSCAR-10 and RS-5 on 21 September 1984 under less-than optimum conditions.

## For All Your Requirements

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The next attempt was to link from OSCAR-13 to OSCAR-12. After weeks of trying, John WA3ETD called on SSB voice to make the first double hop across the pond. John commented, "Guess we made a little history on this one, Dave". The contact was made using 70 cm USB for an uplink, two metres across on LSB, and a downlink on 70 cm USB on 24 November 1987 at 2136 GMT.

Enter the 1990s with RS-10/11 and RS-14. This time, a team of interested satellite hams including Ron G3CAG, John G4ZHG, Ian G0NKA, Ted G6HMS and Richard G7MUB, along with their mentor Pat G3IOR, planned their cross satellite contacts on the chance that RS-14 would be switched to mode "B". Little did they think that Leo UA3CR would take the experiments seriously.

Ian made a request for RS-14 to be switched to mode "B" via packet radio and (surprise, surprise), a reply was received that read, "Which day would you like, and which transponder?" Leo then put the team in direct contact with Andy RK3KP at RS3A via packet radio. The team had six weeks to practice the technique of working through two satellites travelling towards each other at a combined speed of 36,000 km per hour. Compensating for the double reversed Doppler shift as the two satellites passed was part of the challenge. Many hours of practice were spent when Europe had gone to bed, and the QRM was at minimum.

Confirmation arrived that Andy would switch RS-14 over to mode "B" on 7 February 1993 for three orbits before the satellite was out of his range. During the first orbit, orbital predictions and final operating frequencies were finalised with the DOHOP team which had grown to include L22JH, DJ2MHJ, DJ0MY and many SWLs calling in on a DOHOP net on 80 metres. Others were in contact via two metre FM.

The moment that signals were heard from RS-14 will remain one of the most memorable occasions for the team. The satellite had been switched over just for a bunch of hams in Sherwood Forest. On the second orbit, all of the members teamed up on the transponder four minutes before DOHOP time. With 30 seconds to go, all stations changed from RS-10 (two metres up) to RS-14 (70 cm up). Window time was 3 minutes, 10 seconds.

The first station to appear out of the noise was the newest member, Richard G7MUB, with a good (5x3) signal followed by the rest of the team. Good signals were copied with very unusual Doppler shift. The time was 0012 GMT. By the third orbit at 2.00 am local time, the team was ready for the big hop across the pond. Unfortunately, the word that the transponder on RS-14 was

switched on had not got across due to problems with the 20 metre link. With a window of only two minutes, the first station heard was F8SH followed by WINU and K2WER, all on CW along with Ron, G3CAG, and John, G4ZHG.

Well, there you are. Remember, all this happened in 1993 when RS-14 was operational. As far as I can see the only hope today would be to use Fuji and AO-13. They seem to be the only two operational satellites with "opposite" transponders whose passbands overlap. Your timing will have to include a seventh factor, the range of AO-13.

It would be unreasonable to attempt this if AO-13 was too far out in orbit. It may well prove impossible, but it has been done in the past with AO-10 and Fuji. If you decide to give it a go and eventually have some success, please let me have details for the column.

Next month ... Six monthly update of all amateur radio satellite frequencies and modes.

\*359 Williamstown Rd, Yarraville VIC 3013  
CompuServe: 100352.3065  
Internet: 100352.3065@compuserve.com

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## WIA News

### British Amateurs Get 73 kHz Allocation

Further to a WIA News item published in February, the Radio Society of Great Britain (RSGB) has released news that British amateurs can now use a low frequency allocation centred on 73 kHz.

The allocation is only 2.8 kHz wide, that is, plus or minus 1.4 kHz from 73 kHz. All modes may be used, according to the RSGB report, and individuals have to apply to the RSGB first to gain access to the allocation.

The WIA is still pursuing a low frequency allocation for Australian radio amateurs, proposed to be in the 150-200 kHz region, to coincide with allocations available to New Zealand, Papua New Guinea and American amateurs.

### Aerial Power and Communications Cables Under Attack

A Melbourne suburban council has recently adopted a policy to rid its municipality of all power lines and telecommunications cables.

Banyule City Council in Melbourne's north-east describes aerial power and communications cables as dominating the urban landscape, and that the poles they hang from are ugly and unsafe. The council wants all such wiring in its municipality to be located underground by the year 2015.

The policy will affect power supply companies and communications carriers, the state and federal governments, and even property owners who are to be required to bury cables on their land.

The implication for amateur radio from this policy is that it may draw attention to antennas and masts, with the

danger of consequent calls for them to be rigidly controlled. Ill-informed calls might arise for them to be put underground, too.

Municipal councils in other areas around Australia have, or are discussing, similar policies. The Kuringai Council in Sydney has a policy opposing above-ground communications cables and telecommunications masts towers.

There is an irony arising from the Banyule Council move in that it takes in the former city of Heidelberg, which lost a court battle in the 1970s to stop a radio amateur putting up a mast.

The case set a local precedent in town planning appeals which was relied on for many years to show municipal councils that a ruling had been made which declared amateur radio was a normal, acceptable activity in a residential dwelling.

### German Amateur and Cosmonaut Sets a Space Record

Thomas Reiter DF4TR ended a record 180 days in space on 29 February with the successful landing of the Soyuz TM-222 spacecraft which ferried Reiter and two Russian cosmonauts back from a mission aboard the MIR orbital complex, according to the ARRL Letter.

Reiter has entered the record books as the first European Space Agency (ESA) astronaut to perform a spacewalk and the first European to make a second walk in space, as well as completing the longest mission aboard MIR by a non-Russian.

Reiter, 37, had been aboard MIR since September 1995, with Russian cosmonauts Yuri Gidzenko and Sergei Avdeev.

# Awards

John Kelleher VK3DP - Federal Awards Manager\*

A new Australian award is in the offing. It has not yet received the official nod, but it does require you to place your Federal Electorate on your QSL card, when replying to contacts made with all amateurs in the name of the award, which I hope will be up and running by mid-year.

A letter has been received from Soyuz Radiolyubitelei Rossi, hereinafter referred to as SRR, a member of IARU, in which it is clearly stated that they are the official Russian body dealing with all matters concerning Amateur Radio. From their address, PO Box 59, Moscow 105122, Russia, they also run the official Russian QSL Bureau. This letter, dated 26 December, 1995 also contains a list of official office bearers. For those interested, the e-mail address is [dateline@online.ru](mailto:dateline@online.ru). The letter was signed by Andrew Chesnokov UA3AB, Vice-President, SRR.

## Certificado Del Mediterraneo (CDM)

This award is offered by Associazione Radiotecnica Italiana (ARI) the official Italian Amateur body.

Contact at least one fixed station in 22 of the countries on the list shown below, and at least 50 amateur stations located in Italy for a total of 72 contacts since 1 June 1952. Stations may be worked once only. Two classes are offered, mixed mode or phone only. Specify when applying. Minimum

reports are 33 or 338. The countries are: Spain, Balearic Islands, Ceuta and Melilla, Morocco, France, Algeria, Corsica, Sardinia, Sicily, Lebanon, Egypt, Greece, Dodecanese Islands, Crete, Mount Athos, Turkey, Syria, Yugoslavia, Albania, Malta, Gibraltar, Cyprus, Monaco, Tunisia, and Libya.

The ARI Awards Manager reserves the right to demand information on one or more claimed contacts, if necessary. The fee for all ARI awards is \$US3.00 or 10 IRC. Apply to: The Secretary, ARI, Via Scarlatti 31, 20124 Milan, Italy.

## Worked All Italian Provinces (WAIP)

Contact on the HF bands since 1 January 1949, at least 60 provinces of the Italian Republic. Minimum reports 33 or 338. The provinces are: Agrigento (IT9), Alessandria (I1), Ancona (I6), Aosta (IX1), Arezzo (I5), Ascoli Piceno (I6), Asti (I1), Avellino (I8), Bari (I7), Belluno (I3), Benevento (I8), Bergamo (I2), Biella (I1), Bologna (I4), Bolzano (IN3), Brescia (I2), Brindisi (I7), Cagliari (IS0), Caltanissetta (IT9), Campobasso (I8), Caserta (I8), Catania (IT9), Catanzaro (I8), Chieti (I6), Como (I2), Cosenza (I8), Cremona (I2), Cuneo (I1), Enna (IT9), Ferrara (I4), Firenze (I5), Foggia (I7), Forlì (I4), Grosseto (I5), Genova (I1), Gorizia (IV3), Grosseto (I5), Imperia (I1), Isernia (I8), L'Aquila (I6), La Spezia (I1),

Lecce (I7), Livorno (I5), Lucca (I5), Macerata (I6), Mantova (I2), Massa Carrara (I5), Matera (I7), Messina (IT9), Milano (I2), Modena (I4), Napoli (I8), Novara (I1), Nuoro (IS0), Oristano (IS0), Padova (I3), Palermo (IT9), Parma (I4), Pavia (I2), Perugia (I0), Pesaro (I6), Pescara (I6), Piacenza (I4), Pisa (I5), Pistoia (I5), Pordenone (IV3), Potenza (I8), Ragusa (IT9), Ravenna (I4), Reggio Calabria (I8), Reggio Emilia (I4), Rieti (I0), Roma (I0), Rovigo (I2), Salerno (I8), Sassari (IS0), Savona (I1), Siena (I5), Siracusa (IT9), Sondrio (I2), Taranto (I7), Terni (I0), Torino (I1), Trapani (IT9), Trento (IN3), Treviso (I3), Trieste (IV3), Udine (IV3), Varese (I2), Venezia (I3), Vercelli (I1), Verona (I3), Vicenza (I3), and Viterbo (I0).

## Alpine Flowers Award

DX stations require six confirmed contacts from the following: Italy, I1, 2, 3, IK1, 2, 3, IN3, IV3, IX1, IW1, 2, 3; Switzerland or Liechtenstein; Austria, OE2, OE3, OE6 to OE9; France; Germany, DOK, A, C, T or U; Yugoslavia, YU3/S5.

Contacts after 1 January 1966. GCR list and \$US5.00 to: Dolomites Radio Club, 139031 Brunico, PO Box 26, Italy.

\*PO Box 2175 Caulfield Junction 3161

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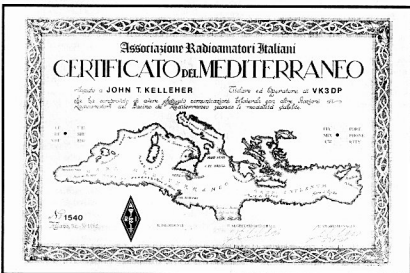
## WIA News

### Old Sol on a Downhill Run

Solar activity continues to be extremely low so far this year, with extended periods of no sunspots at all being reported.

Current projections still have the sunspot minima, which is the count of sunspots and sunspot groups, occurring sometime this year. However, the minima in the solar flux - that is the radiation emitted by the sun at a wavelength of 10.7 cm - is unlikely to occur before early 1997.

Band conditions for 160 and 80 metre enthusiasts will continue to be favourable for some time, but conditions on the higher bands won't begin to lift appreciably until late 1997-early 1998. However, although geomagnetic conditions have been quiet for long periods, when they do become unsettled the maximum useable frequency can get a boost, providing DX opportunities on the higher HF bands for the alert operator



The 375 x 265 mm three colour Certificado Del Mediterraneo awarded to John VK3DP.

# Contests

Peter Nesbit VK3APN - Federal Contest Coordinator\*

Contest Calendar Jun - Aug 96		
Jun 1/2	RSGB Field Day CW	(May 96)
Jun 8	Asia-Pacific Sprint	
Jun 8/9	ANARTS WW RTTY Contest	(May 96)
Jun 8/9	South American WW CW	(May 96)
Jun 15	QRP Day Contest (VK)	(May 96)
Jun 15/16	VK Novice Contest	(May 96)
Jun 15/16	All Asia CW DX Contest	(May 96)
Jun 22/23	ARRL Field Day	(May 96)
Jul 1	Canada Day CW/Phone	
Jul 6	Australasian Sprint (CW)	
Jul 6	NZART Memorial Contest	
Jul 6/7	CQ WW VHF Contest	
Jul 13	Australasian Sprint (Phone)	
Jul 13/14	IARU HF Championship	
Jul 20	South Pacific 160 m Contest	
Jul 20	Colombian DX Contest (Phone/CW)	
Jul 27	Waitakere 80 m Phone Sprint	
Jul 27	West Australian Annual Contest (SSB)	
Jul 27/28	RSGB IOTA Contest	
Aug 3	Waitakere 80 m CW Sprint	
Aug 3	West Australian Annual Contest (CW)	
Aug 3/4	YO DX Contest	
Aug 10/11	Worked All Europe CW	
Aug 17/18	Remembrance Day Contest	
Aug 17/18	Keyman's Club of Japan (CW)	

Readers may remember that, a couple of months ago, I floated the idea of a new contest for 160 m for amateurs in our part of the world, and asked for input from interested parties. Well, I'm delighted to say that things have moved very quickly since then, and the first such contest will take place this July! I am indebted to John Litten ZL1AAS for offering to manage this inaugural event, which has received an enthusiastic reception in New Zealand. Let's show the Kiwis that we can be just as enthusiastic, and help to make this event a real winner.

The present plan is to alternate the management of the contest between Australia and New Zealand, the same as for the VK/ZL DX Contest. However, John and I are already stretched to the limit, so if you are interested in running it next year, please get in touch! The task will be easy and quite enjoyable, not only because you will be helping your fellow amateurs by running a great contest, but you will also get to see first hand what everyone else is working, and using, on top band. I will be happy to answer enquiries on 03 9337 9981 (AH).

For information and assistance this month, many thanks to VKSGN, VK5OV, VK6NK, G3UFY, VE2ZP, ZL1AAS,

ZL1BVK, and LCRA. Until next month, good contesting!

73,  
Peter VK3APN

## Asia-Pacific CW Sprint

1230-1430z, Saturday, 8 June  
1230-1430z, Saturday, 19 October

In this sprint contest, the object is for stations in the Asia-Pacific region to work as many stations worldwide as possible, within two hours, on 20 and 40 m CW. Output power is limited to 150 W. Exchange RST + serial number, and count one point per valid QSO. The called station (usually the CQer) must QSY at least 1 kHz after a QSO. The multiplier is the total number of prefixes, per WPX rules (ie each prefix once only, not once per band). Final score equals valid QSOs x multiplier. Post your log to: James Brooks, 15 Balmoral Road #03-08, Singapore 259801, Singapore, postmarked within seven days; or e-mail to 9v1yc@equator.lugs.org.sg within 72 hours.

## Canada Day Contest (CW and Phone)

0000-2359z, Monday, 1 July

This contest, which runs on the first of July each year to celebrate Canada's confederation, takes place this year on a Monday. This means that those of us who are lucky enough to be at home that day, should be much sought after by the VEs and VOs.

Bands are 160-2 m, CW and phone. Suggested frequencies are (CW) 25 kHz up from the band edge, and (SSB) 1850, 3775, 7075, 7225, 14175,

21250, 28500. Check for CW activity on the half hour. Note, no CW QSOs in the phone sub-bands, and vice-versa.

Any station can work any other, once per band and mode. Exchange RS(T) and serial number; Canadians will send RS(T) and province/territory. Score 10 points for Canadian QSOs including VEO (ie maritime mobile), and two points for others. Canadians with RAC suffixes are worth 20 points. Multiplier is Canadian provinces and territories (max 12), counted once per band and mode: VO1/2 (NFD); VY2 (PEI); VE1/CY9/CY0 (NS); VE2; VE3; VE4; VE5; VE6; VE7; VE8; VE9; VY1 (Yukon). Final score is points x multiplier. Send log and summary sheet by 31 July to: RAC, PO Box 356, Kingston, Ontario, K7L 4W2, Canada.

## 11th Australasian CW and Phone Sprints

6 July (CW), 13 July (Phone): 1100-1159z Sat.  
Presented by David Box VK5OV

The Adelaide Hills Amateur Radio Society is pleased to announce the 11th Australasian Sprints, which are open to all amateurs and SWLs in VK, P2 and ZL. The object is to make (and SWLs to hear and log) as many contacts with amateurs in VK, ZL and P2 as possible, without duplication, on 80 m during a one hour period. Groups of amateurs using a single call sign, eg clubs, are also eligible. Frequencies are 3500-3700 kHz (CW) and 3535-3700 kHz (phone). RS(T) is optional, and the minimum exchange is a serial number starting at any number between 001 and 999, reverting to 001 if 999 is reached. (Note: RS(T) will be required if working participants in the NZART contest taking place at the same time).

For each QSO, logs must show the date and time (UTC), call sign worked (or both call signs for SWLs), and serial numbers sent and received. Logs must be accompanied by a summary sheet showing the name and date of the sprint, the operator's name and address, points claimed, a declaration that the operator has observed the rules and spirit of the contest, special information (eg QRP or mobile operation), and any comments. Multioperator/club entries must show the call signs and names of all operators.

Send logs to: AHARS, PO Box 401, Blackwood, SA 5051, to be received by Friday, 16 August, with the envelope endorsed CW, Phone, or SWL Sprint. Alternatively, logs can be sent via packet to VK5AOV @ VK5W1@ADL.SA.AUS.OZ.

Certificates will be awarded to the highest scoring station in each section in each VK, ZL, and P2 call area. Trophies will be awarded to the outright winners. A certificate will also be awarded to the highest scoring Novice entrant in the CW Sprint, providing that the recipient is not entitled to another CW Sprint award. Other awards may be made at the Contest Manager's discretion. Standard disqualification criteria apply, and the Contest Manager's rulings and decisions are final.

## NZART 80 m Memorial Contest (CW)

0800-1400z, Saturday, 6 July

VKs are invited to join ZLs in this yearly contest to commemorate amateurs lost in World War II. It is open to single operator stations on 80 m, fixed and mobile. The contest has six

operating periods, each of one hour, from 0800Z-1400Z.

A station may be contacted TWICE during each operating period – once on phone and once on CW, provided that such contacts are not consecutive. Exchange RS(T) plus serial number commencing at any number between 001 and 300 for the first contact. On phone, score 15 points for the first QSO with a scoring area, 14 points for the second QSO with that area, descending to one point for the 15th and subsequent QSOs with that area. The same scoring system is used for CW, except that QSO points remain at five for the 11th and subsequent QSO with that scoring area. Scoring areas are VK and ZL prefixes/areas, and DXCC countries. The rules for SWL entrants are similar except that the call signs of the stations heard and being worked must be given, and only the cipher of the station heard is required.

Send logs and summary sheets ASAP to: Memorial Contest, PO Box 20 332, Auckland 7, New Zealand. Nominate the category entered (Open; Phone; CW; Beginners CW; QRP; Homemade SSB), and include a points summary showing the number of QSOs and points for each VK/ZL call area worked. Certificates will be awarded to the top three scoring VKs.

#### IARU HF Championship

1200Z Sat to 1200Z Sun, 13/14 July

This popular contest runs on the second full weekend of July each year. Bands are 160-10 m. Categories are single operator, CW only, phone only, mixed; multioperator single transmitter mixed mode only. Multioperator stations must remain on a band for at least 10 minutes at a time (exception: IARU member society HQ stations may operate simultaneously on more than one band with one transmitter on each band/node, providing only one HQ callsign per band is used).

Exchange RS(T) and ITU zone (P2 = 51, VK4/8 = 55, VK6 = 58, and VK1/2/3/5/7 = 59). HQ stations will send RS(T) and official society abbreviation.

Claim one point for QSOs within own zone or with an HQ station, three points for QSOs with a different zone in own continent, five points for QSOs with different continents. Multiplier is total ITU zones plus IARU HQ stations worked on each band. Final score is total QSO points from all bands x sum of multipliers from each band.

Include a dupe sheet for 500+ QSOs. Send logs postmarked by 9 August to: IARU HQ, Box 310905, Newton, CT 06131-0905, USA. Official forms and an ITU zone/prefix/continent map can be obtained from the same address on receipt of a large SASE with two IRCs or equivalent. Certificates to the top scorers in each category, in each state, ITU zone, and DXCC country. Also, stations with 250+ QSOs or 50+ multipliers will receive achievement awards.

#### 1st South Pacific 160 m Contest

0500-2359Z, Saturday, 20 July

In this contest, which is scheduled for the third full weekend of July each year, the objective is for VK, ZL and P2 stations to work as many local and overseas stations as possible on 160 m. DX stations are also encouraged to participate, but can only work VK, ZL, and P2.

Sections are Phone, CW, and SWL (all single operator). Exchange RS(T) plus serial number.

Stations should claim two points per QSO with their own call area, or five points per QSO for all other call areas. For VK and ZL entrants, if the number in your callsign differs from your actual location, please follow your callsign with the appropriate numeral to indicate your location.

The multiplier is the number of VK and ZL call areas worked, plus the number of DXCC countries worked. The final score equals the total QSO points times the multiplier.

Certificates will be awarded to the top scoring stations in each section, in each call area of VK and ZL, and each DXCC country. Send your log, signed summary sheet, details of your station, and any comments to: John Litten ZL1AAS, Onemana Post, Whangamata, New Zealand, to be received within six weeks from the end of the contest. For 1996, this is 2 September. Logs on disk are most welcome.

#### Colombian Independence Day Contest

0000-2400Z, Saturday, 20 July

This is a worldwide contest, all bands 80-10 m. Categories are Phone and CW (not mixed); single operator (single and all band), and multioperator (single and multitranmitter). Exchange RS(T) plus serial number. Score five points per HK QSO, three points per QSO with stations in another country, one point per QSO with stations in same country, and 10 points for QSOs with official HK HQ Stations. The multiplier is the total countries including HK plus HK call areas worked on each band. "HK" includes all Colombian prefixes. Final score is total QSO points from all bands x sum of multipliers from all bands. At least 2% of QSOs must be with HK, and 10% with stations outside your country. Send logs postmarked by 31 August to: Colombian Independence Day Contest, Apartado 584, Santafé de Bogotá, Colombia.

#### 20th West Australian Annual Contest

SSB: 1030-1330Z Saturday, 27 July

CW: 1030-1330Z Saturday, 3 Aug

(Presented by Cliff Waterman, VK6NK)

The object of this contest is to promote contacts on the 80 m band between VK6 and the rest of Australia and overseas, and for SWLs, to hear and log as many VK6 stations as possible. Call "CQ WA", "CQ WAA", or "CQ Contest", keeping CQs brief (3 x 3 max), as excessively long CQs risk disqualification. Prearranged contacts are not allowed.

VK6 stations will send RS(T) plus Shire Code. All others should send RS(T) plus a serial number commencing at 001. Stations may be worked twice on the night, ie once during 1030-1300Z, and again during 1300-1330Z.

VK6 stations should claim five points for each QSO with VK6, two points for VK1/2/3/5/8, six points for VK4, four points for VK7, and 10 points for VK9/0 and overseas. Stations outside VK6 should claim three points per QSO. Multiply the total number of points by two per VK6 Shire worked. (Note: VK6 stations north of the Tropic of Capricorn should apply a further multiplier of 1.3 to their overall score.) SWL participants score as above using the outgoing Tx score.

Log sheets should be headed with the date and operator's callsign, and include UTC time,

callsign worked, RS(T) sent, RS(T) and shire code received, shire multiplier, and points claimed. Total the points on each page and bring the running total forward. Attach a summary sheet showing the callsign, name, address, score calculation, a declaration that the rules and spirit of the contest were observed, details of equipment and antenna, and any comments. Send your log to: WAA Contest Committee, PO Box 65, Lancelin, WA 6044, to arrive not later than 6 September for both contests.

#### Waitakere 80 m Sprint

Phone: 1000-1100Z, Saturday, 27 July

CW: 1000-1100Z, Saturday, 3 August

This 80 m contest is open to all VK and ZL amateurs. In fairness to other amateurs, it is requested that no linear amplifiers be used in the contest. Call "CQ Sprint", and exchange serial numbers commencing at one and incrementing by one for each contact. RS(T) is not required.

Logs must show the stations worked, and the serial numbers sent and received. Attach a summary sheet and send the log to: Sprint Contest Manager ZL1BVK, 14 Takapu Street, Henderson, Auckland 1208, New Zealand, to arrive by 2 September. Alternatively, logs may be sent via packet, using three columns only with no commas or other delimiters, to: ZL1BVK @ ZL1AB. Certificates will be awarded to the overall winner, the best score in each ZL call area, and the three best VK scores.

#### RSGB Islands On The Air Contest

1200Z Sat - 1200Z Sun, 27/28 July

This SSB contest is intended to promote contacts between qualifying IOTA island groups and the rest of the world, and to encourage expeditions to IOTA islands. Sections are: IOTA Island Stations (ie those with an IOTA reference); World; and SWL.

Use 80-10 m, SSB only. UK stations may not use 3.5 or 7 MHz between 0800 and 1600Z. Following IARU resolutions, please avoid 3.65-3.70 and 14.3-14.35 MHz. Exchange RS plus serial number, plus IOTA reference number if applicable. Score 15 points per QSO with an IOTA station (including UK), and five points for contacts with stations in another DXCC country. The multiplier is the total IOTA references per band added together. Final score is (total QSO points, all bands) x (total multipliers, all bands). SWLs can only log stations outside their own country, except for new multipliers.

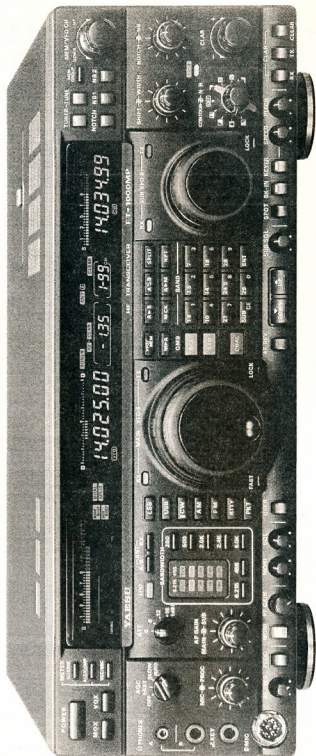
For each band submit a separate log, multiplier list, and dupe sheet. Send log and summary sheet to: RSGB IOTA Contest, C/o S Knowles G3UFY, 77 Bensham Manor Road, Thornton Heath, Surrey CR7 7AF, England, to arrive by 31 August. Certificates will be awarded to the leading stations in each section and continent.

\*PO Box 2175, Caulfield Junction, VIC 3175

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# FT-1000MP



# YAESU Is About To Turn The World Of HF Transceivers On Its Head!

Dedicated to the memory of JA1MP, the founder of Yaesu Musen, we are proud to announce the release of Yaesu's latest high performance HF base transceiver, the new FT-1000MP.

Based upon the legendary performance of the FT-1000 which, for more than half a decade, has been highly acclaimed by the world's top DXers, Yaesu has created a new 100W HF masterpiece built upon proven RF design and the introduction of a new technology to the Amateur marketplace: Enhanced Digital Signal Processing (EDSP). Teamed up with Direct Digital frequency synthesis, an outstanding receiver section featuring a high intercept front-end and a wide variety of IF filters (including a Collins Mechanical Filter), the FT-1000MP's exclusive EDSP facilities provide an impressive array of IF-based noise-reduction and interference rejection facilities for enhanced receiver performance, as well as flexible tailoring of the transmitter for outstanding signal clarity.

The performance of digital processing systems is highly dependent on the quality of software inside the transceiver, and here Yaesu's experience with software design really shines through. Yaesu's IF-based EDSP provides 4 random-noise filtering protocols, audio enhancement with 4 equalisation programs for Tx and 3 for Rx, and an automatic notch filter which identifies and eliminates multiple interfering carriers or heterodynes. Front panel selectable EDSP filter contours (Low, Mid, or High-Cut responses; or Bandpass) aid in QRM rejection, providing improved signal-to-noise ratios and razor sharp selectivity. A comprehensive menu system allows you to easily hear the effect of various EDSP settings, so you can choose the best selection for your operating conditions.

In keeping with the improvements that the EDSP facilities provide, the FT-1000MP also provides new features such as selectable flat response or optimised receiver front-ends, 3 antenna connectors (2 main antennas and an Rx-only socket), selectable tuning steps as small as 0.625Hz, and a Shuttle-jog tuning knob for fast QSY operation. For optimised transmit audio, different SSB IF offsets can be set for both normal and RF speech-processed transmissions, and can be used in conjunction with the Tx EDSP functions. Separate bar-graph S-meters are provided for each receiver, and even a synchronous detection system is used for better AM reception on the Shortwave bands.

Standard features include SSB/CW/AM/FM operation, an in-built AC power supply and Automatic antenna tuner, 13.5V DC socket, dual-mode noise blankers, 500Hz CW and 6kHz AM IF filters, full break-in CW, an in-built electronic keyer with memory, a multi-colour high resolution display, an RS-232 computer interface, and a MH-31B8 hand microphone.

With the new FT-1000MP due to arrive soon, now's the time to call us for a copy of Yaesu's 12-page colour booklet explaining more about the FT-1000MP's new level of HF performance and design excellence. We're sure you'll soon agree that the world of HF transceivers has just taken a giant leap forward.

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B 2426

# Divisional Notes

## Forward Bias - VK1 Notes

Peter Parker VK1PK

### VK1 Award Net Starts

Interstate amateurs will find it easier to work the often elusive VK1 prefix, with the re-commencement of the VK1 Award Net. The net, which started in April, is conducted on 3.570 MHz after the VK1WI News callback.

Interstate operators are invited to call in and make contacts with VK1 stations. Such contacts will count towards the VK1 Award. 20 are needed for VK HF operators, while just 10 contacts are required for VHF/UHF stations, or those operating from outside continental Australia. Note that contacts must be with 20 different callsigns; repeats do not count towards the award. However, contacts with VK1 amateurs transmitting from outside the ACT are valid. As with most awards, contacts through terrestrial repeaters cannot be claimed.

Apart from the basic certificate, endorsements are available. For VK HF operators, these are:- Bronze, 50 contacts; Silver, 75 contacts; and Gold, 100 contacts.

In line with the basic award, endorsement requirements are relaxed for DX and VHF/UHF stations. In these cases, available endorsements are:- Silver, 25 contacts; and Gold, 50 contacts.

Submission of a log extract signed by the VK1 Awards Manager, or two other amateurs, to the VK1 Division, is required to claim the award, which is a handsome certificate featuring Canberra's Black Mountain Tower. Cost is \$3.00 Australian for VK amateurs, or five IRCs for overseas applicants. Endorsements cost \$1.00 (or two IRCs) each. Applications can be sent to: Awards Manager, WIA ACT Division, GPO Box 600, Canberra 2601.

The VK1 Division hopes that the Net and Award will increase on-air operating by VK1 amateurs, who are well-known for their HF inactivity, and foster more interest in VK1 from interstate and overseas. Already, at least one Tasmanian amateur has worked over 200 different VK1 stations on HF over the years.

### VK1 DX Cluster Trial

A local packet BBS sysop is gauging local support for a VK1 packet radio DX cluster. Carl VK1KCM reports that he has placed a trial DX Cluster compatible program on his BBS.

The program is called Clusce and, while it doesn't have exactly the same interface as the standard Packet Cluster, it works in a similar fashion.

To use it, connect to VK1KCM-1 and type DXC.

Carl is looking into having it connected to other Packet Cluster systems.

### Broadcast Move Successful

As reported last month, the VK1WI broadcast has moved from a Wednesday to a Sunday evening. The move has been popular with listeners, with callback numbers up 50 to 100 percent.

### News Relay Changes

After two years of relaying the VK1WI Broadcast on 80 metres and, more recently, running the VK1 Awards Net, John VK2EJC has decided to stand aside and let another person try their hand at performing this task.

In the twelve months that I've been Broadcast Officer, I've found John a pleasure to work with. His dedication and enthusiasm will be missed. So, on behalf of the VK1 Committee and the dozens of people who have listened to the 80 metre relay, I would like to thank John for a job well done.

### VK1WI/Forward Bias on E-mail

Listeners and readers are now able to lodge contributions to the VK1WI Sunday Broadcast and Forward Bias via Internet e-mail. The address to which items should be sent is [parkerp@pcug.org.au](mailto:parkerp@pcug.org.au). However, due to technical difficulties at the time of writing, it is preferable to send longer messages via packet radio to VK1PK@VK1KCM if this mode is available to you.

### VK2 Notes

Richard Murnane VK2SKY

### Annual General Meeting

The Divisional AGM was held at Amateur Radio House last month. The turnout was modest, compared with the politically tumultuous years of the recent past.

All outgoing Councillors were re-elected; this, together with the lower attendance at the meeting, was seen as an indication of general satisfaction with the current state of affairs within the Division.

Councillor Cesar Miranda VK2TCM subsequently resigned from his position,

which prompted a number of comments on the packet network, mainly from amateurs who are not members of the Institute. As a result of Cesar's resignation, the next highest polling candidate, John Hams VK2IH was deemed.

We extend our congratulations to all successful candidates, and we thank Cesar for the fine work he has done in the service of the Division.

The 1996-97 Council then is Michael Corbin VK2YC, President; Eric Fossey VK2EFY, Membership Secretary; John Hams VK2JH, Dural Officer; Peter Jensen VK2AQJ, Vice President; Pieter Kloppenburg VK2CPK, Parramatta Officer; Tony Liolio VK2ZLT, Assistant Dural Officer; Geoff McGrorey-Clark VK2EO, Education Officer, QSL Bureau Liaison; Eric Van De Weyer VK2KUR, Treasurer; and Ken Westerman VK2AGW, Affiliated Clubs Officer.

As an aside, one of the more interesting reports that came to light at the AGM was an analysis done and presented by Bruce Carroll VK2DEQ, who found a correlation between the fiscal fortunes of the Division, and the 11-year sunspot cycle. Noting that the Division's relative finances seemed to lead the sunspots by a year or so, we can expect DX conditions to start improving in the very near future - HI! (In the past, others have noted a similar correlation between the sunspot cycle and the level of political angst in the general amateur community. No doubt, some enterprising university student could get a PhD out of this observation.)

### NSW Clubs List on Web

Would you like some free publicity for your club? Affiliated clubs are again invited to submit more details about their clubs, such as meetings, special events, etc for inclusion on the Division's Web page. Better yet, if your club has its own Web page, please send the URL to me on Internet at [richardm@eta.org.au](mailto:richardm@eta.org.au), or on packet to [VK2SKY@VK2OP.NSW.AUS.OC](mailto:VK2SKY@VK2OP.NSW.AUS.OC).

Thought for the month: "Computers in the future may weigh no more than one and a half tons." Popular Mechanics, forecasting the relentless march of science, 1949.

### VK6 Notes

John R Morgan VK6NT

### Divisional AGM

At the AGM, held in Perth on 30 April 1996, there were insufficient nominations for the positions on the Divisional Council, so all those nominated were declared elected. At the Council Meeting on 7 May 1996, appointments were made by Council



to fill the vacancies, and so the office-bearers for 1996/97 are: President, VK6LZ Cliff Bastin; Vice President, VK6KZ Wal Howse; Secretary, VK6ZLZ Christine Bastin; Treasurer/Federal Councillor, VK6OO Bruce Hedland-Thomas; Alternate Federal Councillor, VK6UU Will McGhie; Membership Secretary, VK6IW Dave Wallace;

Councillors, VK6TS Tony Savory, VK6XH Keith Bainbridge, and VK6ZGT Glen Thurston.

## New Venue for Meetings

In order to restore our General Meetings to the long-standing formula of the third Tuesday of each month, and in order to save money, the Divisional Council has decided to change the meeting venue.

So, until further notice, General Meetings will be held on the third Tuesday of each month in the Board Room, 3rd Floor, CWA House, 1174 Hay Street, West Perth, commencing at 8 pm. There is no meeting in December. All interested persons (members and non-members, licensed or listener) will be made welcome. Free coffee and biscuits are available at "half time".

Meetings of Council will be held on the first Tuesday of each month, in the smaller Function Room at the same location.

## How to Get There

CWA House is a three-storey office-block on the north side of Hay Street in West Perth, about 80 m west of the intersection with Havelock Street.

The entrance to the rear car-park is via the laneway at the western end of the building. You are requested not to park in the residents' bays, which are the ones directly in line with the building's rear doors. Enter the building via the front or rear doors, and take the lift to the top floor, where the meetings will be held in the Board Room. The rear entrance and facilities are wheelchair-friendly.

The exit from the car-park is via the laneway at the eastern end of the building. Be advised that this section of Hay Street is a one-way road, and so all traffic must therefore turn right on leaving.

## VK6WIA News Broadcast

The Division's Broadcast Officer, Tony VK6TS, has taken a few months' leave while he moves house. Until Tony has re-established his shack, Phil VK6KS has volunteered to take over, and transmit the broadcast from the Club Station VK6QC, which is located at the Para-Quad Recreation Centre in Shenton Park.

## WIA Bookshop

Members will be pleased to learn that Roy Watkins VK6XV has volunteered as the Divisional Bookshop Officer. The preferred address for postal correspondence is now PO Box 10, West Perth WA 6872.

## WA Repeater Group AGM

The AGM was held on the evening of Monday, 6 May, and was attended by only seven members. The following were appointed for the next 12 months: Patron, VK6MM "Mac" McDonald; President, VK6KRB, Ralph Bradstreet; Vice President/Secretary, VK6LZ Cliff Bastin; Treasurer/Membership, VK6ZLZ Christine Bastin; Technical Officer, VK6UU Will McGhie; Committee/Net Controller, VK6CSW Clive Wallis; Committee, VK6KCQ Eve Morgan and VK6NT John Morgan.

The two required auditors were not appointed, since it was preferred that they should not be members of the Committee. The Secretary would appreciate hearing from any volunteers.

WARG invites you to take part in its informative and entertaining VHF net, held every Sunday morning, commencing at 10.30 am. Listen for VK6RRG on the Lesmurdie repeater (VK6RLM, 146.750 MHz). Meetings are held at the Scout Hall on the corner of Gibbs Street and Welshpool Road, East Cannington, on the first Monday of every month, starting at about 7.30 pm. The odd-numbered months are General Meetings, and the even-numbered months are Technical Meetings.

## If You Have Material ...

All material for inclusion in this column must arrive on or before the first day of the month preceding publication. Packet mail may be sent to VK6NT@VK6ZSE.#PER.#WA.AUS.OC, or write to PO Box 169, Kalamunda WA 6076, or telephone (09) 291-8275 any time.

## "QRM" News from the Tasmanian Division

Robin L. Harwood VK7RH

Tasmania was shocked and appalled by the tragic events at Port Arthur on 28 April. A lone gunman, armed with an extremely high-powered weapon, mercilessly gunned down 35 innocent people. This horrific event has deeply affected the psyche of the entire state and the impact of it has left its mark on many, not only here in this beautiful island, but throughout the nation and indeed throughout the world.

As a mark of respect, those attending the May monthly meeting in the Southern

Branch held a minute's silence. Divisional Council wishes to also express our sincere condolences to those who have been affected by this tragedy.

On 27 April, the Divisional Council met in the north-western town of Penguin, which is halfway between Burnie and Devonport. This was the first full meeting since the Annual General Meeting in March. Unfortunately, our Divisional President was unable to attend due to work commitments in Hobart, so VK7ZDJ, who is Divisional vice-president, took the chair.

Quite a deal of housekeeping was done at this meeting, with Council deciding who will fill the Divisional ex-officio positions for 1996. We also discussed the agenda for the upcoming Federal Convention in Melbourne with our Federal Councillor and decided our response to the various agenda items. There was a hefty inwards correspondence file, some of which involved lengthy discussions. As well, 13 new members were accepted into the Division, which some are saying might be a record for VK7.

The casual vacancy on Council has still to be filled and the Northern Branch is to choose nominees to submit to Council at its June monthly meeting. The next scheduled Council meeting will be held in Launceston on 22 June; the final venue will be announced on the VK7WI weekly broadcast.

On 15 April, the Division lost its donated e-mail address of [wiaats@tamarcom.com.au](mailto:wiaats@tamarcom.com.au), when that provider suddenly went out of business, only giving six hours warning for subscribers to download any outstanding e-mail. Hundreds of users were caught as the lines were disconnected ahead of the six hour warning. Therefore, we recommend that any Divisional e-mail be sent to the Secretary's private e-mail address at [robroy@tassie.net.au](mailto:robroy@tassie.net.au) but with the mail clearly marked for WIA Tasmanian Division. An alternative e-mail site is currently being investigated by the President.

A suggestion was raised informally at Council that perhaps the Division could investigate the feasibility of feeding VK7WI to the various centres by landline for rebroadcast. The audio quality has suffered via the existing two metre relays, especially by the time it gets to the north-west. At this juncture we don't know if it would financially viable to landline to the north and north-west, but I am certain that the Broadcast Officer will be doing his sums.

The following have been appointed by Council to fill the ex-officio positions: FTAC, VK7AX; Education Officer,

VK7KK; QSL Bureau, VK7PP; Historical Officer, VK7RO; IARU Monitoring Service, VK7RH; Hon Solicitor, Mr P Corby VK7ZAX; Awards Manager, VK7BE; Hon Auditor, Mr Justin Cook; Broadcast Officer, VK7JK; "QRM" Correspondent, VK7RH; and WICEN Co-ordinator, VK7PU.

In addition, Jim Forsyth VK7FJ was re-appointed as Federal Councillor for the next 12 months.

## Meetings for June

The Southern Branch will be meeting at the Domain Activity Centre on Wednesday, 5 June, commencing at 2000 hours.

The Northern Branch will be meeting at St Patrick's College. A talk on Computer Networks entitled "Exploding your Lan" will be given by VK7KJC. It will be on Wednesday, 12 June, commencing at 1930 hours. The College entrance is on Mount Leslie Road, Prospect.

The North-west Branch will be meeting at the usual venue at 1945 hours on Tuesday, 11 June. More details on VK7WI.

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## WIA News

### New WIA Members

The WIA bids a warm welcome to the following new members who were entered into the WIA Membership Register during the month of April 1996.

L30930 MR W RITTER  
VK1HBH MR R E HOWIE  
VK1KIP MR B F KOBIER  
VK1KT MR K E THRELFALL  
VK1KZ MR J V LOFTON  
VK3BEZ WIA EASTERN ZONE  
ARC INC

VK3JBH MR M CATIC  
VK3TJN MR B PATERSON  
VK3TJY MR J YOUNG  
VK5AZ MR R K VON SANDEN  
VK5VST MR S T VICKERY  
VK6BCP MR W PORT  
VK6XAM MR A MURACE  
VK6YET MR B A F BLUM  
VK6YGM MR S W L CHEW  
VK7HCK MR C J KLEY  
VK7HSE MR S V EVANS  
VK7KF MR T N PEARSON  
VK7N1K MR N J KLEY

The VK4 Division advises of the following new members:

J HIGHMAN VK4BUZ  
S SALVIA VK4EMS  
J VALERO VK4FKV  
S BURJAK VK4BSB  
R INGHAM VK4IRC  
K CAVANAGH VK4SP

## Club Corner

### Oxley Region Amateur Radio Club

The Oxley Region Amateur Radio Club will once again be holding its Annual Field Day at the Sea Scout Hall, Buller Street, Port Macquarie on the NSW Holiday Coast.

The Field Day will be a single day event on Sunday, 9 June 1996, commencing at 9 am. All the usual events, such as equipment displays, trash and treasure markets, and fox hunts will be held. There will be a "talk-in" on the VK2RPM repeater on 146.700 MHz.

The co-ordinator will be Bruce Walker VK2HOT, who can be contacted on 065 838 360. Further information on the Port Macquarie area can be obtained from, and accommodation bookings can be made through, the Port Macquarie Visitors Information Centre on 065 831 077.

Peter Cox VK2IPC  
Publicity Officer

### Moorabbin and District Radio Club Inc Weekly Award Nets

The MDRC Weekly award nets are active every Monday night. The first is a VHF net commencing at 7.30 pm on 146.550 MHz FM. Next is the usual net at 8 pm on 3.567 MHz, plus or minus QRM. Look out for the club call sign of VK3APC.

### Novice Classes

Do you know someone who is interested in studying for their Novice Licence? Are they having trouble finding a study course?

For those interested, contact the course organiser, Glen Moore on (03) 9865 7040 during business hours or (03) 9531 9301 after hours. The course will be conducted on Wednesday evenings between 7.30 pm and 9 pm. Glen will be able to advise of the cost and answer any questions you might have.

Denis Babore VK3BGS

### Radio Amateur Oldtimers Club (RAOTC)

At the committee meeting on Tuesday, 14 May, Secretary/Treasurer Arthur Evans VK3VQ recommended that the current annual subscription of \$5.00 be continued and that, in future, a nominal \$2.50 entrance fee be charged to cover cost of the membership certificate, postage, etc.

The Secretary's recommendations were accepted and will apply in the next financial year, July 96 to June 97.

Election of office bearers resulted as follows: President and Broadcast Presenter, Allan Doble VK3AMD; Vice President and Assistant Broadcast Co-ordinator, John Fullagar VK3AVY; Secretary/Treasurer, Arthur Evans VK3VQ; "OTN" Magazine Editor, Stewart Day VK3ESD; Broadcast Co-ordinator, Ron Fisher VK3OM; Club History Co-ordinator, Bill Gronow VK3WG; and Committee Members, Ken Seddon VK3ACS and John Tutton VK3ZC.

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## FTAC Notes

John Martin VK3KWA, Chairman, Federal Technical Advisory Committee\*

### New Records

The distance for the new 1296 MHz mobile record between VK3XPD and VK3ZQB has been confirmed as 260.4 km.

### Permitted Transmission Modes

Thanks to those amateurs who wrote with comments on the recent article on permitted modes. One interesting point is that the mode designators like 4K00J3E have been used for some years in RIB71 and its predecessors, but no-one has complained about them before. It seems that the new licence conditions have been read more carefully than the old ones were!

### 40 Metres: Digital Modes

Comments are still invited on the proposal to expand the 40 metre digital modes segment to 7030 - 7045 kHz. If there are any strong objections, it would help to receive them before the decision is made!

\*PO Box 2175, Caulfield Junction, VIC 3161

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**Support the WIA in  
order to protect  
amateur radio  
frequencies**

## Education Notes

Brenda M Edmonds VK3KT\* Federal Education Coordinator

In my last column I described the status of the Syllabuses and Question Banks, and promised further information about the Question Banks.

While the Banks were being revised, a lot of effort was put into producing a complex computer program which can compile and print acceptable examination papers at the touch of a computer button. The Banks were designed to complement the program. Test runs have produced, within minutes, a high proportion of useable papers. Papers will still require human checking until the program has been used enough to ensure that no possible problems have been overlooked.

The Committee decided that satisfactory papers should have:

- \* only one question from any specific topic;
- \* no overlap of topics from different syllabus sections; and
- \* no question which might give a lead to the answer of another question on the same paper.

In addition, for consistency, all papers should have:

- \* a similar distribution of levels of difficulty;
- \* a similar number of questions needing diagrams; and
- \* an even distribution of a, b, c or d for correct answers.

To achieve all this:

- each syllabus section was divided into a number of subsections equal to or more than the number of questions to be taken from that section, with only one question to be taken from each subsection;
- where topics recur in later subsections, or questions could prompt answers to other questions, exclusion codes were applied;
- each question was coded with a degree of difficulty, and an overall distribution of difficulties determined;
- an acceptable range of questions with diagrams was set; and
- the numbers of a, b, c and d answers was evened throughout the Bank. (This does not, however, preclude an uneven

distribution on a finished paper as the letter of the correct answer is not a criterion in the selection program.)

The Advanced Question Bank contains 1000 questions, distributed in accordance with the formula used on an examination paper, ie 20 questions per question on a paper. The Novice Bank, because of the much shorter syllabus, was set at 500 questions, but has in fact reached 550, ie 11 per question on a paper, to ensure that all topics are adequately covered. The Regulations Bank was much more work. It will contain about eight questions per question on a paper.

As yet we are still awaiting comment on the Advanced and the Regulations Banks from the SMA. The Novice Bank will be submitted to the SMA very shortly. Let me again assure candidates that plenty of notice will be given before questions from the revised Banks are used for examination papers.

The Question Bank Committee has now disbanded, at their request. I would like to repeat my earlier thanks and appreciation for the time, effort and expertise which they contributed, and for their tolerance of my queries and requests – and my cooking.

\*PO Box 445, Blackburn VIC 3130

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## Radio and Communications

INCORPORATING radio  and *Q&A*

Really, what else is there to say other than that you should be reading R&C if you want all the latest news and information....

In this month's issue you can read comprehensive reviews on the FT-900 and FT-51R units while Jack Haden writes that DXing can be a h(w)ealth hazard.

There is an interesting piece asking the question "Is your balanced feeder really balanced?"

Steve Ireland looks at using loop antennas to beat the noise levels and Jason Reilly expresses some concerns about RF Radiation - just how serious is it from the amateur's point of view?

There's a whole lot more too including Tom Sundstrom's internet report, Jim Smith's report on DX and IOTA, John Batty's monthly review of interesting SW stations he has heard and where to find them (and these are not broadcast stations), a review on another DSP unit, what's happening with weather satellites - and plenty more...

As we keep saying, a good, well-balanced radio mag is *much* more than just reviews and R&C is about as well balanced as you can get!!

Don't miss out on your June issue (on sale 22 May) — it's great reading.

**Check your local newsagent today - better still - subscribe!**

(PS. We also have the biggest collection of radio-oriented Classified adverts in the country. There's lots of them because they work so well.)

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# How's DX

Stephen Pall VK2PS\*

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Discussing propagation and the subject of the "bottom of the cycle" is a daily topic among DXers talking on the air. Figures are quoted, theories are discussed and opposite opinions are heard on the same afternoon from different parts of the world. Many express the opinion that we have reached the solar minimum and that propagation is on the "uptake". Others are quoting the very low 10 cm flux numbers to support their own views.

Many of us listen to the "figures" as given at 45 minutes past each hour by WWV on 15, 10 and 5 MHz. These solar flux numbers relate to the 10 cm solar flux which is the measure of the sun radiation taken daily, usually at Ottawa, Canada, at 2800 MHz. This solar flux is also an indication for the ionisation density of the ionosphere in the F region. A solar flux number of 66 represents "quiet sun" conditions.

Admittedly, the solar flux numbers were consistently low during April. Most of the days they were below 70 but, on 30 April, the number was as low as 65. Is this the end of the cycle? "Not at all," says Dr Richard Thompson, a solar scientist with the Ionospheric Prediction Service. "There are no new reverse polarity sunspots on the sun besides those reported earlier. A rise in numbers of these reverse polarity sunspots would indicate the beginning of the new cycle." Dr Thompson is of the opinion that, with the decay of cycle 22, the bottom of the cycle will last longer and deeper than with previous cycles. The official confirmation of reaching the bottom of the cycle comes after all the relevant information from all over the world is collected and analysed. This will take many months of study; therefore, the event occurs first and the announcement follows at least six months later.

The other important "figure" of what is relevant regarding propagation, is the "A" index. This index is the daily value of the geomagnetic disturbances which occur on earth. These disturbances result from changes in the speed or density of the solar wind which, when it reaches the earth, disturbs the earth's magnetic field.

The variation in the strength and direction of the magnetic field is measured near the surface of the earth (called "magnetic disturbance") which, among other phenomena, disrupts high frequency communications. "This local disturbance varies at different points of the earth," says Dr Phil

Wilkinson, an ionospheric research scientist with IPS. "The local A index figures have a relation to the land masses on the earth and, as the northern hemisphere has more land than the southern hemisphere, local values which influence the conditions could be different."

One hears a lot about "planetary A index" known as Ap. This is a global figure, a composite index collected from many points of the globe. If the value of the planetary A index is seven or less, we talk about quiet condition. If it is between eight and 15, it is in an unsettled state, and a figure of 16 to 29 would indicate an active geomagnetic disturbance. In the month of April we had either quiet or unsettled conditions, except for a few days when the magnetic field was active. The figures given by WWV often quote the Fredericksburg A index, which comes from an observatory near Washington DC, and is therefore a northern hemisphere index.

The K index is defined from the total variation of the geomagnetic field over a three hour interval of universal time (UTC) with the index scaled in a manner which depends on the location of the site. So, when you hear the K index which quotes Boulder, Colorado that is where it was measured.

In Australia the geomagnetic information comes usually from the solar observatory at Learmonth, Western Australia. The active DXers, who are on the band for a few hours each day, did notice in March and April that, despite the very low flux numbers, propagation was from average to good and, on some days, was even excellent. These enhanced conditions were not due to the rise of the solar cycle, but to the Vernal Equinox factor which occurred on 21 March. This is the day when the sun crosses the equator, and the number of daylight hours and the number of night hours are equal all over the world. At this time of the year, the absorption in the ionosphere is much lower, there is greater ionisation, and propagation between the southern and northern hemispheres is much improved. There is spring in the north and autumn in the south, and the ionosphere is more similar and stable than during the summer or winter seasons. This produces a marked improvement in openings between the continents, especially in the north-south direction and vice-versa, especially before local sunrise and sunset times. Similar enhanced conditions, to a lesser degree,

occur in October and November with the autumnal equinox which is on 21 September.

If you are a serious DXer, and make use of the solar indices as a guide to propagation, why not use also the services of the IPS in Sydney where a recorded message will tell you about the local Australian propagation conditions? The recorded information is changed each day at 2300 UTC time. The message is not long and, due to competitive telephone charges, a phone call to (02) 414 8330 will not cost you very much. Good luck!

## Croker Island, NT - VK8

The ARRL has its DXCC program and the RSGB has its own IOTA. The IOTA (Islands On The Air) program was started by a British short wave listener, Geoff Watts (BRS 3129). He wrote, in 1964, "Now that propagation conditions are poor, DX getting scarce, the possibility of brand new DXCC countries eventually becoming extremely remote, top DXers retiring because there is nothing new left to work, it is proposed that an entirely new DX achievement be created, the Islands On The Air Award, to promote more activity and interest among all DXers, many of whom could go on brand new island DXpeditions themselves."

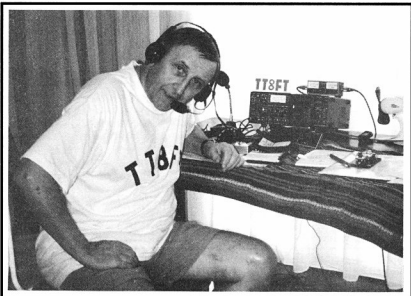
This spirit of "island hopping" is driving a young novice DXer, Stuart VK8NSB, to organise and go on his third IOTA expedition. The group of DXers who will go to Croker Island will be Stuart VK8NSB, the well known senior island hopper Mal VK6LC/VK8LC, as well as an enthusiastic short wave listener, Bob Finlayson.

Croker Island is located about 300 km NE of Darwin in the Northern Territory (11-12.5° S and 131.5 - 134.5° E). The traditional Aboriginal owners agreed to allow an amateur radio DXpedition on the island. Accommodation for the group will be organised by the principal of Mamaruni school. Out of the total seven days (8 to 14 August) two days will be spent with the school children teaching and showing amateur radio to them and having some fun activities. The rest of the time will be a full scale activity with three stations operating 24 hours a day. The activity will give a new reference number in the IOTA directory.

A special QSL card will be provided for those who send their cards to the QSL manager VK8HA at his callbook address (VK8HA, H G Anderson, PO Box 619, Humpty Doo, NT 0836).

## Sable Island - CY0AA

Sable Island is a 44 km long and 1.5 km wide sandbar located in the Atlantic Ocean, 270 km east of Halifax, Nova Scotia (43° 57'



**Frank DL7FT active in Chad as TT8FT.**

N, 59° 55' W). It lies in the path of most storms which travel up on the Atlantic coast of North America.

The island, known as the "Graveyard of the Atlantic", has claimed more than 500 ships and 10,000 lives since the 16th century. Discovered by the Portuguese in 1583, the island is a sorry tale of attempted colonisation. It is an inhospitable environment with its lack of a harbour, the constantly changing sands and the howling winter storms. The island, since its discovery, has been in the hands of the Portuguese, the French, the British, shipwrecked sailors, and pirates.

The British Admiralty finally established a life saving station on the island in 1802. Lighthouses were built. Even with the advent of 20th century, life was hard on the island. Despite lighthouses, vessels continued to run aground on the island, the last shipwreck being the MANHASSET which foundered in 1947. That same year a radio beacon was installed and has warned off vessels ever since. The island is now a restricted area, in order to protect the fragile eco-system. The island is currently populated by weather station personnel and visiting scientists. A herd of over 200 wild Sable Island horses, descendants of early French colonist horses, roam the island as free as the wind.

A three member team of DXpeditioners, Mike VE9AA, Wayne W90EH and Ken WA8JOC, will be visiting the island for a 15 day activity from 18 June to 2 July. The usual DX frequencies will be used from 2 to 160 metres. QSL for all HF contacts to be sent to WD8SDL with the usual return envelope

and return postage. Bureau cards will be handled but they are a lower priority. The team declared they "will not run lists", and "will try to use standard splits".

Only orderly pile-ups will be tolerated. You are asked to listen for instructions to be given by the operator. Use your complete call only. Good luck!

### **Uncle Margie Island - VK9XZ/6**

Neil VK6NE advises that the VK9XZ/6 team (VK6BFI Joe, VK6UE Bill, VK6KTN Gerald and VK6NE Neil) travelled north from Perth to Geraldton, then by a 61 foot lobster boat the "Lady Kaye" to the island called Uncle Margie in the Pelsart section of the Houtman-Abrolhos group of islands. This ragged chain of more than 100 islands is located 450 km NNW of Perth and 60 km west of the port of Geraldton.

The winds in the area are never less than 22 knots, the islands can be lonely, uncomfortable and dangerous, and there is never enough fresh water. There are 193 fishermen licensed to work on the 22 islands from March to May each year. It is illegal for visitors to stay ashore overnight unless invited to a fisherman's camp.

Uncle Margie Island is only about three metres above sea level. During the short duration of this IOTA activity, which centred around the Australia Day long weekend (26 January), about 2,500 QSOs were made. The group of amateurs, who call themselves the West Australian Island Hoppers, is looking forward to a similar adventure to an as-yet unknown destination around Australia Day next year.

### **Chad - TT8FT**

Chad is a former French colony in the middle of Africa. It has been an independent republic since 1960. The capital N'Djamena is in the south-western part of the country near the lake of Chad. This is the country where the well known German DXer, Frank Turek DL7FT, landed on 22 February for a 14 day activity. Frank's QSL card and a photograph arrived the other day with an interesting letter which clearly indicated the difficulties of a sole DXer in a strange country which has very few radio amateurs and of whom almost all are visiting from another country.

Here are some details from Frank's letter, "It was very difficult to get my amateur licence, being number three from the new Government, as the first French amateur in Chad. I was alone and my French, which is the official language of the country, is very limited. A knowledge of Arabic would have been useful. There was this big market outside my hotel and I was the only white person among the many hundreds of locals. When I was outside my hotel I engaged a policeman as my bodyguard but, of course, I had to pay him an hourly fee for his services. The police had checked out my transmitting station three times and so did the hotel manager. In addition, I had to go with the Police Lieutenant by taxi to the Surete (Security) with one extra passport photo to get the Surete rubber stamp into my passport and I was issued with a separate ID card. Only after these formalities were completed was I allowed on the air next day. I was using an ICOM 740, 100 watts, and a 220 volt power supply. I used an FD4 antenna for 80, 40, 20, 17, 12 and 10 metres at a height of 15 to 20 metres. I used a separate dipole on 15 metres. I also had a "brand new" home-made antenna with me for 160 metres, but the hotel manager did not allow me to put this long wire across the main street. Some days I worked up to 17-18 hours continuously, drinking only about five litres of water and no other nourishment. From time to time there was competition on the air. TT8BP and TT8AB on SSB, and TT8DJ and TT8SS on CW, became active. The temperature was between 39° to 41° every day with 15-20% humidity. There are millions of mosquitoes and malaria is quite frequent."

So ends Frank's letter. We, the armchair DXpeditioners, have it easy. Our colleagues, who go places to provide us with a rare DX country, deserve our greatest respect.

### **Future DX Activity**

\* Per LA7DFA is now active on Jan Mayen Island as JX7DFA. QSL via LA7DFA, Per Einar Dahlen, N-8099, Jan

Mayen, Norway or via PO Box 105, N-6520, Rensvik, Norway.

\* Since the middle of April there is a new DX net in operation. The well known DXer OE6EEG is the net controller on Tuesdays at 0600 UTC on 14220 kHz and every Friday and Saturday at 1400 UTC on 14220 kHz.

\* Graham VK9WG is active on Willis Island. He is part of the team of four island scientific personnel. He is not very active due to work commitments but he was heard on Sunday, 28 April working many stations. He will be on Willis until the end of June. Personnel on Willis is changed every six months and it is not known whether the next group will have a radio amateur amongst them. Graham uses a 100 metre long wire antenna, end fed with a tuner, which favours the southerly direction (he is on the northern end of the wire). QSL via the Bureau only to VK5GW.

\* Warren VK0WH on Macquarie island was heard more often recently, trying to decrease the pile-up. He is active mostly on CW in the 40 m band on Sundays, Tuesdays and Thursdays at around 0930 UTC. He is transmitting on 7009 kHz and listens on 7012 kHz. Occasionally he is also heard on 14040 kHz CW.

\* Sam FT5WE from Crozet occasionally joins the ANZA net (14164 kHz at 0500 UTC), giving VKs and ZLs the opportunity to work this rare DX country.

\* Eric F5CCO plans to be on the air from 27 June to 4 July from J6 Grenada.

\* Jean-Pierre F5FHI is active as 9U5DX in Burundi. QSL via F2VX. EA1FH was also heard using the 9U5CW callsign.

\* In mid-June, the Grand Bahamas will be activated by WA4VCC, K4MQG and AA4R using the callsign K4MQG/C6.

\* OD/F5PWJ will be active from Lebanon on CW and SSB on all bands till 30 September. QSL via F5PRR.

\* In July and August, VS/ZS6YG will be on the bands from Namibia. The operator is Charlie KY0A. QSL to home call.

\* Valentin RU1ZC will be active for three months from July from the Russian Antarctic Base SAAM MIRNY using the R1ANZ callsign. QSL via RU1ZC.

\* Joe N1OCS is active, when work pressure permits, from Ghana as 9G5RC. This is a re-issued callsign. Do not confuse this activity with previous operations. Joe's permit expires 31 December 1996. QSL to home call.

\* Des G0DEZ will operate as ZD8DEZ from late May until the end of the year from Ascension Island. QSL to his home address, Des Watson, 12 Chadswell Heights, Lichfield, Staffordshire, VS13 6BH, England.



Melville Island, NT, Stuart VK8NSB (l), and David VK8HZ (r) with pre-school children and teacher Mrs Cook.

\* FT5WE is often on 40 metre CW at his sunset time of 1400 UTC. His correct QSL route is via F5GTW.

\* Sanyi HA7VK (ex-XU7VK and XU95HA) and his wife Judith HA7RJ will arrive in North Korea on 27 May 1996 as visitors and will stay there until the end of July. Sanyi will try to obtain permission to operate.

### Interesting QSOs and QSL Information

\* FG5FC - John - 14250 - SSB - 0451 - Apr (E). QSL via F6DZU, Hubert Loubere, 289 Ave De Caupos, F-40600, Biscarosse, France.

\* HS50A - Dale - 14320 - SSB - 1316 - Apr (E). QSL via the Thailand QSL Bureau.

\* 4L7AA - Mike - 14246 - SSB - 1231 - Mar (E). QSL to The Manager, PO Box 32, Warsaw 19, Poland.

\* ZK2ZE - Morten - 7006 - CW - Mar (E). QSL to LA9GY Morten Antonsen, Hallsetereina 6, N-7027, Trondheim, Norway.

\* TP0CE - 14214 - SSB - 0617 - Mar (E). QSL to Francis Kremer, 31 Rue Pasteur, F-67490, Dettwiller, France.

\* A45ZN - Tony - 14217 - SSB - 1310 - Apr (E). QSL to Anthony George Frank Selmies, Box 981, Muscat 113, Oman.

\* VK9XM - Martti - 14164 - SSB - 0543 - Apr (E). QSL to JA1BK, Kan Mizoguchi, 5-3 Sakuraga Oka 4 Chome, Tama City, Tokyo, 206, Japan.

\* FT5WE - Stan - 14173 - SSB - 0608 - Apr (E). QSL to F5GWT Daniel Piolat, 3 Rue de Belvedere, F-38300, Bourgoin Jallieu, France.

\* D2/YO9CWY - Dan - 14164 - SSB - 0534 - Apr (E). QSL to YO9CWY, Daniel

Motronea, PO Box 133, Buzau, R-51000, Romania.

\* FS/OK1HOB - 14164 - SSB - 0537 - Apr (E). QSL to OK1MKD Josef Snabl, Puchmajerowa 1218, CS-54401, Dvur Kralove, Czech Republic.

\* IR8ANT - Ciro - 14222 - SSB - 0548 - Apr (E). QSL to IR8ACB, Ciro Accardo, Via Nazionale 366, CP 118, I-80059, Torre Del Greco, Italy.

\* EM1OC - Vlad - 14224 - SSB - 0602 - Apr (E). QSL to UY5XE George A Chlianc, Box 19, 290000 Lvov, Ukraine.

### From Here and There and Everywhere

\* Barbara V85BJ, Brian V85EB and their family left Brunei on 6 June 1996. They are coming home to Australia. Barbara advises that all mail, including direct QSL cards for V85EB and V85BJ should be sent to PO Box 62, Northbridge, NSW 2063. QSL cards via the bureau should be sent to her QSL Manager VK2KFS.

\* Despite very bad propagation and lack of operators, the special event station VK2IMD, celebrating the birthday of Marconi on 20 April, made a total of 375 QSOs. 24 DXCC countries were worked with a total prefix tally of 127 by only six operators. The station also worked two other Marconi stations in the USA. If you require a QSL card from VK2IMD, send your card to WAHRA (Wahroonga Amateur Historical Radio Association), PO Box 600, Wahroonga, NSW 2076, Australia with the appropriate self-addressed reply envelope and sufficient return postage.

\* Many "island chasers" missed out on the very short activity by VK2BRT on Broughton Island, a new island for the IOTA award. Propagation was not at its best,

favouring mainly the northerly direction. According to well informed sources, there is a possibility that a second activity will take place during this year by another group of operators.

\* The last time there was activity from Clipperton Island was five years ago. Jay WA2FU has been reported to be interested in returning to the island in March 1997. At the moment he is searching for hams, or friends of hams, with a sailboat capable of making the trip.

\* New prefix from Italy. When the Italian authorities ran out of the I prefix they introduced the IK prefix in 1980. Within 15 years they ran out of the IK prefixes. New Italian amateurs are now being given IZ prefix call signs with a three letter suffix from AAA to ZZZ. Within a few years Australia will be in a similar situation.

\* Jim VK9NS was in a happy mood the other day. After many months of negotiations, lots of difficulty and waiting patiently, he received his Indian licence with the callsign VU2JBS, the suffix of which happens to be his initials. The importation licence to allow him to take equipment to India will follow shortly.

\* It is with great regret that I report the passing of Bob VK9ND on Norfolk Island. Bob, who had many friends on the airwaves, was also a well known DXer. He will be missed by the amateur community.

\* Len VK8DK returned to the "Red Centre", after a long holiday in Europe, to take up his position at a new location at Ali-Curung, formerly known as Warabiri. This is a community of 400 aborigines located 190 km south of Tennant Creek and 20 km east of the Stuart Highway. Len is employed there in an administrative capacity by the community. Very few of us know that Len once held a licence in Europe with the call 0Z7CK many, many years ago.

\* According to Bob KK6EK, all the direct QSLs for XRO7 and XRO2 have been sent out, a total of 20,000 of them.

\* QSLs for DX1EA, YV3A, CP6/0H0XX, CP6AA and OH0XX/DUI are to be sent to Olli Rissanen, Suite 599, 1313 So Military Trail, Deerfield Beach, FL 33442, USA (mail drop only).

\* Several Russian stations are asking QSLers not to send reply envelopes but pre-addressed labels and two IRCs as return postage.

\* Pirate department. 9N1JAR, 3V8AS and TT8AK are suspected pirates, so do not waste energy, time and money QSLing them. 9K2EC reports that a pirate has used his callsign on 80 m SSB. He has no antennas for 80 m and operates almost exclusively on CW.

\* Olympic confusion. Stations operating

from the State of Georgia, Atlanta being the capital, may substitute the number 4 in their call sign with 96 or 26 from 15 April to 31 August. Stations in Georgia with any other number may add 00 to their number.

\* R1FJZ leaves Franz Josef Land in August when he will pick up his QSL cards from his mail drop DF7RX.

### QSLs Received

VK9XZ/6 (3w VK6NE) - T32ZB (7w DL4ZB) - TT8FT (4w DL7FT) - XY1HT (5w G3NOM in Thailand) - TN7OT (2w AL7OT) - TP0CE (3w F6FQK).

### Thank You

Many thanks to my supporters who

regularly supply me with news and information. Special thanks go to VK2DEJ, VK2KAA, VK2KFU, VK2TJF, VK2XH, VK4AAR, VK4FW, VK5WO, VK8DK, VK8NSB, VK9NS, DL7FT, VE1CBK, V85BJ, YJ8AA, ARRL DX Desk, IPS Radio and Space Services in Sydney (especially Dr R Thompson and Dr P Wilkinson), and the publications *QRZ DX*, *The DX Bulletin*, *The DX News Sheet*, *The DX News Magazine*, *INDEXA*, 425 *DX News* and *Go List QSL Managers list*.

\*PO Box 93, Dural NSW 2158

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## WIA News

### Intruders Chased From Two HF Bands

A Western Australian amateur was able to get a Russian broadcaster to move from the 40 metre band by the simple expedient of faxing the station director!

In January, Alek Petkovic VK6APK monitored a station on 7070 kHz signing "Voice of Russia World Service". As this is in the exclusive amateur segment of the 40 m band, Alek obtained the station's fax number and advised them that "operation of broadcasters in this part of the band is not permitted". He also reported the intrusion to the International Amateur Radio Union Monitoring Service (Intruder Watch) and the International Telecommunications Union (ITU).

The station subsequently decamped for another frequency and Alek received a reply by fax in mid-March.

Meanwhile, in April, the 40 m band was used by Australian military forces during war games off the Western Australian coast, which involved the RAAF and the Royal New Zealand Air Force (RNZAF).

WIA Intruder Watch Coordinator in the west, Graham Rogers VK6RO, said a 10 kW teletype signal was transmitted on the weekend of 13-14 April from the RAAF base near Perth. Appearing on 7003 kHz, it was on the air for several days and was also heard on the east coast.

The transmission stopped after the WIA contacted the Spectrum Management Agency's Perth Area Office during office hours on the following Monday (15 April).

Intruder Watch has issued a world-wide alert for observations of the Brazilian Navy using 14,002 kHz for teletype transmissions. The 75 baud, 850 Hertz shift transmissions use the call sign PWK33 and have been heard in Europe.

Reporting intruders pays off. A list of frequent and persistent intruders is

available from the WIA Federal Intruder Watch Coordinator, Gordon Loveday VK4KAL. His mail address is Freepost Rubyvale 4702, Queensland, or on packet VK4KAL@VK4UN-1.

### Olympic Call Signs for US Amateurs

American radio amateurs in the State of Georgia began using special call sign prefixes in April to celebrate the holding of the 100th modern Olympic games in the State's capital city, Atlanta.

The US Federal Communications Commission (FCC) has announced three permitted optional variations for call sign prefixes. These include exchanging the US's 4-district (W4, N4 etc) alpha prefix to either "96" to mark the year, or "25" to signify the 25th modern Olympics. The third option is to add a "double zero" after the current district digit in the call sign.

So, you might hear, instead of W4XYZ, "96-4-XYZ" or "25-4-XYZ", or even "W4-00-XYZ".

The special optional call sign prefixes began appearing on the bands after Easter and will be heard on the air until 31 August.

Meanwhile, in Europe, the Republic of Austria celebrates its millennium this year and Austrian amateurs have been authorised to use the special prefix "OEM", in place of their normal "OE" prefix, for the year, from 1 January to 31 December.

You may have already heard a few OEM1xx call signs on the band, instead of the usual OE1xx. The added M stands for the Latin word "mille", meaning 1000.

The Austrian amateur society, OVSV is sponsoring two special awards for the occasion, cryptically known as the WOEM and MOEM. Details from the OVSV.

# Novice Notes

Peter Parker VK1PK\*

## Operating an HF Station – Part One

Having obtained a callsign, established a station and erected an antenna, the next step is to learn how to operate it. This requires an ability to adjust equipment to transmit a clean signal, as well as a knowledge of basic operating procedures. *Part One* will focus on the latter, while *Part Two* looks at some of the specialised operating activities, such as DXing and awards and contests, enjoyed by amateurs. While Novice licensees may now use digital modes on HF, this series concentrates on SSB and CW operation.

## Which Band?

Amateurs have a range of bands from which to choose. Thus, at any one time, a well-equipped amateur station can contact stations over various distances by selecting the right band. Band conditions vary according to the season, time of day and sunspot activity. Novice licensees can use HF segments 3.525 – 3.625 MHz (80 metres), 21.125 – 21.300 MHz (15 metres), and 28.100 – 28.600 MHz (10 metres).

In very general terms, the lower frequency bands (such as 80 metres) are most used at night, while the higher bands (10 and 15 metres) are more active during the day. These higher bands are also greatly affected by sunspot numbers, with the ability to make DX (overseas) contacts on them peaking in years of high solar activity. At the moment, we are in the trough of the eleven-year sunspot cycle (Figure 1), so we can look

forward to improving conditions in the next few years. At this phase of the sunspot cycle, 15 metres is likely to yield more DX contacts than 10 metres for the Novice operator, though ten metres can still be productive, particularly during major contests.

Around mid-winter and mid-summer, ten and six metres come alive due to a phenomenon known as "sporadic-E". Sporadic-E occurs during all phases of the sunspot cycle and permits distances of approximately 500 to 2000 kilometres to be covered, even with just a few watts and simple antennas. It can occur at any time, but is more prevalent during the day.

The time of day is an important determinant of band conditions. While local contacts are possible on 80 metres during daylight hours (particularly in winter), it is during the evening that this band finds most use, with distances of up to 3000 kilometres being typical. An important advantage of 80 metres is the almost blanket coverage that is obtainable. This is in contrast to the higher bands where a "skip-zone" exists between the limit of ground-wave coverage, and where the sky-wave, reflected from the ionosphere, returns to earth.

For cross-town communication (say up to 20-30 kilometres), any HF Novice band will provide results, though 10 metres is preferred, because of its lack of crowding, low band noise, and relative efficiency of mobile antennas. Somewhat longer distances can be spanned on 80 metres, or else on the higher bands when sporadic-E

propagation is apparent. DX contacts are most prevalent on 15 and 10 metres (mainly during the daytime), but could be possible on 80 metres if you possess an antenna whose radiation pattern is concentrated at low angles.

## The Antenna

It is assumed that an antenna has already been erected. The typical Novice station may include a dipole or inverted vee for 80 metres, a trap vertical or small beam for 10 and 15 metres, and a ground-plane, discone, J-pole or similar antenna for VHF/UHF, with different capabilities on different bands in line with the operator's interests. All these antennas can be constructed at home; details are provided in magazine articles and in the standard antenna handbooks.

## Making Contacts

There are more similarities between HF SSB and CW operating procedures than there are differences. In both cases, it is wise to tune across the band you intend to use prior to transmitting. This provides a general impression of band conditions.

Assuming the transceiver and/or antenna tuning unit are properly tuned up (a process which, if performed on-air at all, should be done on a clear frequency at low transmit powers), the process of seeking contacts can begin. There are three main ways of obtaining contacts. These are as follows:

**Responding to a CQ call:** Tuning across the band may reveal one or more stations calling CQ. A CQ, which is a general call to all amateur stations, is your invitation to respond. Such a response takes the form of sending the other station's callsign, followed by your own callsign, perhaps sent several times if signals are weak.

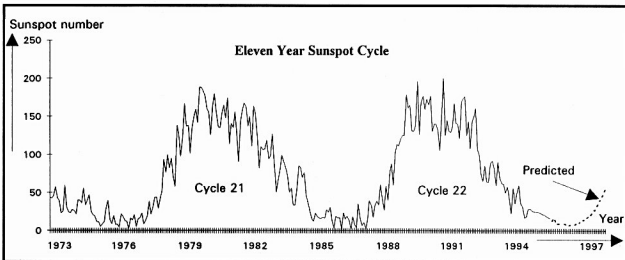


Figure 1 – Chart of sunspot activity over recent years.



If the calling station is VK6AA, and your callsign is VK1AA, your response on SSB could be:- VK6AA, THIS IS VICTOR KILO ONE ALPHA ALPHA, VK1AA.

On CW, you would send:- VK6AA de VK1AA VK1AA VK1AA K. In this case, "de" means from, while "K" is an invitation to transmit (or "over" on voice).

If the station replies to another station, you may wait until the contact finishes, or move to another frequency. On the other hand, the calling station may ask "QRZ?". This indicates that the station heard a signal, but was not able to decipher the callsign. The correct procedure in this case is to repeat your call, possibly speaking (or sending) a little slower this time.

**Calling CQ:** If no other stations are calling CQ, it is a good idea to issue a call yourself, especially if you have reason to suspect that the band may be open (eg hearing beacons on 10 and 15 metres). After selecting a clear frequency, it is polite to ask if it is in use. On SSB, this is accomplished by announcing your callsign and asking if the frequency is occupied, while CW operators simply send "QRL?". If no response is received, the frequency is yours to use.

The length of CQ calls depends on band activity and conditions. If band occupancy is sparse, a longer CQ call is suggested to attract the attention of the casual listener tuning across the band. In order to maximise the chance of obtaining contacts, and to minimise interference with other operators, the Amateur Radio Bandplans should be adhered to at all times. Essentially this means not operating SSB on frequencies reserved for CW or digital modes. Bandplans are published annually in the *WIA Radio Amateur's Callbook*.

On SSB, a typical CQ call is as follows:- CQ CQ CQ CQ CQ CQ CQ CQ THIS IS VK1AA, VICTOR KILO ONE ALPHA ALPHA, VK1AA, CALLING CQ AND LISTENING (before calling, make sure you are on the right sideband - LSB for 80 m, USB for 15/10 m).

A CQ call on CW may be:- CQ CQ CQ DE VK1AA VK1AA VK1AA K.

Higher speed operators may choose to make their calls longer, to increase the chance of the call being heard. However, this should not be overdone; hearing 20 CQs before a callsign is sent will cause most listeners to seek contacts elsewhere.

**"Tail-ending":** An effective means of obtaining contacts (especially if using low power) is by the use of "tail-ending". This means listening in to a conversation, and calling one of the stations involved immediately after the contact ends. Timing

### Table One - CW Procedural Signals (Prosigns)

CQ	A general call to all amateur stations.
AR	End of message, full stop.
K	"Over", invite any station to transmit.
KN	A specific station only to transmit.
BK	Invite receiving station to transmit.
R	All received OK.
SK	End of contact.
CL	Going off the air (clear, switching off).

Note that all two-letter prosigns are sent with the letters merged together (except CQ).

### Table Two - Commonly Used Q Signals for CW Work

QRL?	Is this frequency in use? (use this just before calling CQ).
QRM	Man-made interference (eg other stations on/near your frequency).
QRN	Natural interference (eg thunderstorm activity)
QRO	High(er) power.
QRP	Low(er) power - normally five watts or less.
QRQ	Send faster (eg QRQ 12: please send faster at 12 wpm).
QRS	Send slower (eg QRS 8: please slow down to 8 wpm).
QRT	Stop transmitting.
QRX	Please wait (eg QRX 1: please wait one minute).
QRZ?	Please call again (used when a station has responded to CQ call, but you missed their callsign).
QSB	Fading signals.
QSK:	"break-in mode" - your equipment allows listening while sending. QSL? Can you acknowledge receipt (of message)?
QSO	Conversation.
QSY	Move to another frequency (eg QSY 3530 means QSY to 3.530 MHz).
QTH	Transmitting location.

Note: The above lists the most commonly used Q-codes for amateur CW operation. The meanings shown are those that are most used on-air, and vary slightly from the definitions in the standard handbooks. To ask a question, simply attach a question mark (?) to the Q-signal; for instance, QRQ? means "Shall I send faster?". While Q-signals are sometimes used on SSB, plain English is probably as effective in most cases.

### Table Three - Common Abbreviations for CW Work

ABT	About
AGN	Again
AS	(Please) wait
CQ	Calling any station
CUL	See you later (similar to BCNU, HP CU AGN, etc)
ES	And
FB	Fine Business, excellent
GM(N)	Good morning (night)
GUD	Good
HR	Here; Hear
HW	How
NR	Number (used in contests)
PSE	Please
RST	Signal report (see later)
SIG	Signal
SRI	Sorry
TKS,	
TNX.	
TU	Thank you
UR	Your; You're
VY	Very
WKD	Worked
WL	Well; Will
WX	Weather

Abbreviations for other words exist, but their use is less prevalent than those in the list presented here. Their use can make CW communication faster and more pleasurable, particularly at slower speeds.

is important here, particularly if unable to hear all stations on frequency.

When "tail-ending", the call made can be just as if one was answering a CQ. If used with care, "tail-ending" is probably the best way to make contacts on the HF bands.

During the Contact

Once contact has been established, the first few exchanges normally entail a swapping of RST signal reports, names and locations (QTH) with the other station. From this point, the conversation may extend to the antenna and equipment, and (unfortunately) the seemingly ubiquitous weather report. Discussion beyond this point is a matter for those concerned, though amateur regulations and ethics mean that there are some topics best left alone.

The purpose of signal reports (see Table 4) is to give your contact some idea of how their signals are being received. Signal reports on phone consist of two digits. The first of these is readability (R), on a scale of 1 to 5. The second figure given is the strength (S) of a signal, this time on a scale of 1 to 9. The third digit, used by CW operators to indicate the purity of the received tone, is also on a scale of 1 to 9. Because of the quality of most modern equipment, reports of less than T9 are rare.

Some tend to accept the S-meter as gospel, without realising that S-meter calibrations vary between transceivers. Cases of people refusing to give signal reports if a signal (though perfectly readable) is not moving their meter's needle are not uncommon. If in doubt as to what report you should give, it is best to ignore the meter on your transceiver entirely.

Ending a Contact

If the time that it can take is any guide, many people have trouble ending contacts. On CW, this manifests itself in the endless repetition of 73, BCNU, CUL, CUAGN and other solecisms, while on SSB, many a fictitious saucerpan must have boiled over! Try to end contacts cleanly and keep the number of "final-finals" to a minimum; this makes it easier for other stations who might want to call one of those about to depart.

Conclusion

This article has provided some pointers on basic operating techniques. Join me in August for Part Two, which includes more detailed information on DXing, contests and award hunting.

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ar

Table Four - Standard Readability and Strength Scale

(source: ARRL Handbook)

Readability	
1	unreadable
2	barely readable, occasional words distinguishable
3	readable with considerable difficulty
4	readable with practically no difficulty
5	perfectly readable
Strength	
1	faint signals, barely perceptible
2	very weak signals
3	weak signals
4	fair signals
5	fairly good signals
6	good signals
7	moderately strong signals
8	strong signals
9	extremely strong signals
Tone	
Scale of 1 to 9. Nearly all signals today are T9.	

Packet World

Grant Willis VK5ZWI\*

Introduction

Over the past couple of months, we have been looking at how packet radio works and, in particular, how the Amateur AX.25 protocol has been constructed. For many of us, this is how most of our packet radio communications will be conducted. There are, however, many different and more advanced techniques that can use packet radio frames to provide a far wider range of services and facilities. The TCP/IP packet switching protocol was born as a result of work done on the original predecessor to the Internet we know today. TCP/IP is a very powerful networking system, and through the efforts of people like Phil Karn KA9Q and many others, TCP/IP is available via Amateur Packet Radio. John, VK1ZAO takes us through how TCP/IP and AX.25 work together this month.

TCP/IP Implemented Over AX.25

TCP/IP implements the ISO layered protocol standard, but in four levels rather

than seven (see Fig 1). However, as with the standard, each layer has a particular function to perform, and only passes data to the layer one above and below, and communicates with other stacks by talking to the layer at the same level. The acronym TCP/IP is actually derived from two of the most commonly used protocols in the centre layers.

Data Encapsulation

Data Encapsulation describes the way in which the data from each layer is passed to the layer below. This layer then adds its necessary control header and passes this frame as data to the layer below it (see Fig 2). That layer again adds its control header and passes this whole lot on as data to the next level down, etc. On reception, as the data progresses back up the stack, each layer checks the header for its level and decides what to do with the data segment. Do we ask for a resend, discard because it's not for us, do some requested operation, or pass the data up to a higher level?

We shall look at each of the frame

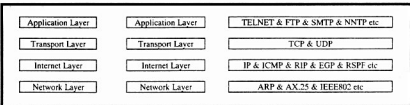
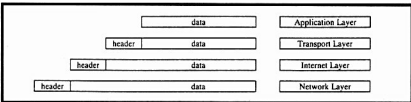


Figure 1 - Transmission Control Protocol/Internet Protocol



**Figure 2 - Data encapsulation**

structures used to pass a typical data packet using TCP/IP over AX.25

## TCP - Transmission Control Protocol

(Refer to Fig 3)

**Functions:** To keep track of which application sent the data, and which application is to receive that data. Also to keep track of sequence numbers both ways so that lost frames can be detected - checksum to ensure validity of data - other control fields.

**Source & Destination Ports (16 bits + 16 bits)** - Indicate the service required, and maintain what is linked to what at each end.

**Sequence Number (32 bits)** - The sequence number of the first data byte of this segment - similar to AX.25's sequence number but here we count bytes, not frames, and we use a 32 bit number not a 3 bit number.

**Acknowledge Number (32)** - Next sequence number that we expect to receive (valid if ACK control bit set) used as in AX.25 to detect lost data.

**Data Offset (4 bits)** - Due to variable "Options" field we need to know how long the TCP header is. This field gives us that length in 32 bit words.

**Reserved (6 bits)** - Next 6 bits.

**Control Bits (6 bits)** - URG - Urgent Pointer Valid; ACK - Acknowledge Field Valid; PSH - Push Function; RST - Reset the connection; SYN - Synchronise Sequence Numbers (connect); FIN - No more data (disconnect).

**Window (16 bits)** - How many bytes we are willing to accept - largest amount of unacknowledged data.

**Checksum (16 bits)** - Checksum over all of (TCP) header and data.

**Urgent Pointer (16 bits)** - Locates urgent data in data field.

**Options (32 bits)** - Variable additional bytes at end of header - must be padded out to 32 bits. 32 bits in amateur packets. Type 2 Option (Maximum segment Length), Length 4 bytes, 16 bit maximum segment size in bytes.

## IP - Internet Protocol

(Refer to Fig 4)

**Functions** - Identify level of service required - Fragmentation control of datagram - Lifetime of datagram (in case it gets locked in a routing loop) - Identify the Transport Layer Protocol being used (TCP or other) - Identify Sender and Receiver addresses.

**Version (4 bits)** - Identifies the version of the Internet header (currently version 4).

**IHL (4 bits)** - The length of the header in 32 bit words. Allows for inclusion of a variable option field after the destination address but before the data.

**Type of Service (8 bits)** - Precedence of Service and delay/throughput/reliability. "0x00" Normal/Routine for amateur use.

**Total Length (16 bits)** - Total length including Internet Header and data. Identification (16 bits) - Value assigned by sender to aid re-assembly of datagrams.

**Flags (3 bits)** - Indicates whether the datagram may be fragmented, and whether this is the last fragment of the datagram.

**Fragment Offset (13 bits)** - Indicates the location of this fragment for re-assembly in units of 8 bytes (64 bits).

**Time to Live (8 bits)** - How long this datagram is allowed to live - each forwarding decrements this field by 1. If it gets to zero the datagram dies. To protect against infinite routing loops.

**Protocol (8 bits)** - Indicates the Transport Layer this data is to go to. Header Checksum (16) - Checksum of the IP header is checked and re-computed at each step (TTL changes).

**Source Address (32)** - IP address of the origin of this data (the IP number 44.136.1.80, etc). This and the destination address must be mapped to a physical device by the network layer. In the amateur world this means mapping an IP number to the callsign field of the AX.25 frame. This callsign being the next in the chain, and not necessarily the final destination.

**Destination Address (32)** - Destination IP address of this data.

**Options (variable x 32)** - Not used in amateur packets.

Source		Port		Destin.		Port	
Sequence				Number			
Acknow.				Number			
Data Offset	Reserved	Res. & flags		Flags	Window		
Checksum				Urgent		Pointer	
Options						Padding	
Users				Data			

**Figure 3 - TCP Transmission Control Protocol**

Version	IHL	Service	Type	Total	Length
Ident.				Flags	Fragment Offset
Time to Live	Protocol	Header			
Source		Address			
Destination		Address			
TCP		Header			
Users		Data			

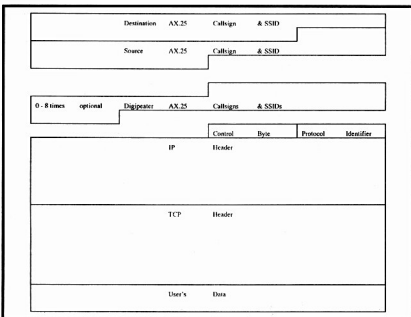
**Figure 4 - IP Internet Protocol**

## AX.25 - Network Protocol

(Refer to Fig 5)

**Functions** - Move data from one hardware location to another. These hardware addresses may map to the Internet Addresses contained in the IP Header, or they may simply be one step closer in a string of hardware addresses through which the packet must transfer to get to its final destination. Note here that, although the error detecting/resending afforded by a "connected" AX.25 link may be used, it is not really necessary as such errors can be detected and handled by the TCP. We may, therefore, send data in UI (unnumbered information) frames and not bother with a formal AX.25 connection.

**Destination Address (56 bits)** - Callsign and SSID of the destination of this part of the link.



**Figure 5 – AX.25 Network Protocol**

**Source Address (56 bits)** – Callsign and SSID of the source of this leg of the link.

**Digi (56 bits x 0-8)** – Up to 8 callsigns through which the data is to be routed to get to the destination.

**C (8 bits)** – AX.25 Control Byte.

**P (8 bits)** – AX.25 Protocol Identifier.

This frame, when transmitted will be prepended by a flag, and terminated with a 16 bits FCS and then the next flag.

## Summary

I hope that this paper has been of some assistance in introducing you to the world of amateur packet communication at the physical level, gives you a slightly better idea of how data is exchanged from one system to another, shows you how ONE of the other transport layers is implemented on top of the basic AX.25 structure, and that you have gained some insight into the channel sharing used by the majority of AX.25 implementations.

## Conclusion

Lastly I would like to refer you to the references that I used in preparing this paper, and encourage you all to delve into the exciting processes that enable you to so easily communicate keyboard to keyboard, or to send a message to another amateur who resides in almost any location on Earth. **John Woolner, VK1ZAO** (Paper Presented to the Canberra Packet Radio Group's Technical Symposium 1995).

Thanks to John VK1ZAO for allowing us to reproduce his paper for a wider audience.

The following references can be used for those who are interested in pursuing this further. If you have any particular topics you would like to see covered in forthcoming issues of Packet World, why not put your thoughts either on packet or in the post. I can

be reached at one of the following addresses:-

Packet: VK5ZWI@VK5TTY.#ADL.# SA.AUS.OC

Internet: gwillis@dove.mtx.net.au

Post: Packet Doctor, C/o WIA SA Division, GPO Box 1234 Adelaide 5001

## References

*Amateur Packet Radio and TCP/IP* – Phil Karn KA9Q

*AX.25 Link Layer Protocol Specification Version 2.0* – ARRL American Radio Relay League

*AX.25 Link Access Protocol Amateur Packet Radio Version 2.2* – William A Beech NJ7P, Douglas E Nieslsen N7LEM, Jack Taylor N7OO – ARRL

*RFC: 791 – Internet Protocol Specification* – Information Sciences Institute  
*RFC: 793 – Transmission Control Protocol Specification* – Information Sciences Institute

*TCP/IP Network Administration* – Craig Hunt – O'Reilly & Associates

*Local Area Networks* – John E McNamara – digital press

*The Matrix* – John S Quarterman – digital press

*Basics of Data Communication* – Harry R Karp – Electronics Book Series

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## Pounding Brass

Stephen P Smith VK2SPS\*

A reminder that the North East Radio Club's two metre Morse code beacon has been shifted to a new frequency and a new location. The beacon is operating under the callsign of VK5VF on 145.660 MHz and resides on top of Mt Lofty for greater coverage.

Output is 10 watts and the cycle is as before, that is 10 minute segments of random generated characters from 5 to 12 wpm, starting at 8.00 am/pm local Adelaide time.

## Golden Section Morse Key Project

This month we will continue with the straight key construction project designed by Dr Jim Lycett G0MSZ. The diagram, reproduced here with permission from Morsum Magnificat, provides all the remaining mechanical details.

Next month we will conclude this interesting project.

\*PO Box 361, Mona Vale NSW 2103

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**Sign up a new WIA member today – use the form on the reverse of the Amateur Radio address flysheet.**



# International Amateur Radio Union Monitoring Service (IARUMS) – Intruder Watch

Gordon Loveday VK4KAL\*

## IARUMS News

The radio telephone link heard on 18.155 MHz has now been reported operating on 18.175 MHz, which is outside our band. This move was caused by world-wide amateur radio QRM!

Radio Pakistan has vacated the frequency it occupied for far too long. This advice came from the SMA – I assume they mean 7.018/4 MHz? But let us continue to check this frequency. The general feeling is they will return when they think it safe to do so. Keep it on your list!

An update on the OTHR mentioned in my April column. I believe the government has given permission for this operation to go ahead regardless of amateur opposition. This will not stop observations from other regions, including our own. What action will be forthcoming from VK? Do you think the WIA should have meaningful discussions with the Minister for Communications about these intrusions into our legitimate HF bands? It is NOT war-time.

Once again an official protest, lodged on 13 March 1996, has been made to the Technical Director, Voice of Islamic Republic of Iran in Tehran, for the removal of their broadcast station operating on 7.070 MHz. All previous requests have been ignored, so don't hold your breath.

A fax was sent on 12 March 1996 to the

"Main Centre for Control of Broadcasting Networks, Ministry of Telecommunications of Russian Federation" regarding Voice of Russia transmissions on 7070 kHz. A reply has been received ... in Russian! So, until we can get a translation, we can only guess. I am indebted to a VK6 observer for this information. Thanks, Alek.

Please let IARUMS know what non-amateur signals stop you using any part of the exclusive amateur bands. We must have this information so we can start taking remedial action. Yes, it is hard, unrelenting work to keep what we have left of our bands. If your IARUMS co-ordinators can do the worst of it, what is stopping you from helping them? Or are you one of those who think the bands are not worth fighting for?

## The IARU Monitoring System – Part 6

(Previous issues of *Amateur Radio* magazine contain parts 1 to 5 of this series about the IARU Monitoring System.)

### Reports

It is preferable that reports be typewritten. Where this is not possible, hand written CAPITAL letters should be used. Normal amateur abbreviations and Q codes may also be used on reports, "normal" being those abbreviations appearing in lists given in ARRL, RSGB, & ITU publications.

## Allocation of Frequency Spectrum for Purposes of Intruder Watch

### 160 Metres

1800 – 1825 kHz. Amateur Service is Primary Service exclusively.

1825 – 1875 kHz. Amateur Service is Secondary, not exclusive.

### 80 Metres

3.500 – 3.700 kHz & 3.794 – 3.800 kHz

In IARU Region 3 the 80 m band is shared with fixed services. It is NOT exclusive to the Amateur Service. FIB and A1A non-amateur signals CANNOT be considered to be intruders. But broadcast stations are intruders!

### 40 Metres

7.000 – 7.100 kHz is Primary Amateur Service exclusively. Non-amateur signals ARE intruders.

7.100 – 7.300 kHz is shared by international broadcast stations ONLY. Any non-amateur signal, other than broadcasters can be considered to be an intruder. Non-amateur FIB and A1A signals ARE intruders.

### 30 Metres

10.100 – 10.150 kHz is shared with Fixed Service stations. The Amateur Service DOES NOT have exclusive use of these frequencies. Broadcast stations are intruders.

### 20 Metres

14.000 – 14.250 kHz is Primary Amateur Service. Any non-amateur signals are those of intruders.

14.250 – 14.350 kHz is a segment shared with Iran, The People's Republic of China, and the USSR fixed services. It is NOT exclusive to the Amateur Service. FIB & A1A signals (RTTY and CW) of non-amateur stations cannot be considered as intruders, but broadcast stations are.

### 17 Metres

18.088 – 18.168 kHz is shared with the Fixed Services. Non-amateur FIB and A1A signals are NOT intruders, but broadcast stations are.

### 15 Metres

21.000 – 21.450 kHz is exclusive to the Amateur Service.

### 12 Metres

24.890 – 24.990 kHz is SHARED with FIB and A1A signals.

### 10 Metres

28.000 – 29.700 kHz is Primary Amateur Service.

I hope this series about the IARU Monitoring System has given some idea of the "workings" of the IARUMS, and whetted your collective interest in adding your "bit" to the cause.

\*Federal Intruder Watch Co-Ordinator, Freepost No 4  
Rabyvale QLD 4702 or VK4KAL@VK4UN-1

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## WIA MORSE PRACTICE TRANSMISSIONS

VK2BWI	Nightly at 2000 local on 3550 kHz
VK2RCW	continuous on 3699 kHz and 144.950 MHz 5 wpm, 8 wpm, 12 wpm
VK3COD	Nightly (weekdays) at 1030 UTC on 28.340 MHz and 147.425 MHz
VK3RCW	Continuous on 144.975 MHz, 5 wpm, 10 wpm
VK4WIT	Monday at 0930 UTC on 3535 kHz
VK4WCH	Wednesday at 1000 UTC on 3535 kHz
VK4AV	Thursday at 0930 UTC on 3535 kHz
VK4WIS	Sunday at 0930 UTC on 3535 kHz
VK5AWI	Nightly at 2030 local on 3550 kHz
VK5RCW	Continuous on 144.975 MHz, 5 wpm to 12 wpm
VK6RCW	Continuous on 147.375 MHz, 4 wpm to 11 wpm
VK6WIA	Nightly at 1930 local on 146.700 MHz and nightly (except Saturday) at 1200 UTC on 3.555 MHz

## Over to You - Members' Opinions

All letters from members will be considered for publication, but should be less than 300 words. The WIA accepts no responsibility for opinions expressed by correspondents.

### Bletchley Park

The Milton Keynes and District Amateur Radio Society are running their normal "Car Boot Sale", but with a difference this year, on 1 September 1996.

We hope to attract and establish the whereabouts, eventually, of some 12,000 people who once worked at the Government Code and Cypher Centre in Bletchley Park, North Buckinghamshire. Since a great number of them were "communicators", it follows that they may have taken the amateur radio path at some time in their lives. We hope to make this an annual get-together and hopefully bring news of old friends from all over the world.

The Bletchley Park Trust are keen to build up their growing database of former residents of the Park. We are finding new leads through the continuous stream of visitors that come twice monthly to see the Museum.

**Des Shepherd G3LCS**  
**Station Manager GB2BP**  
**Bletchley Park**  
**England**

*(The full notice was supplied but it is only relevant to UK readers. Ed)*

### Hamads Work!

In February, *Amateur Radio* carried my classified advertisement seeking a manual for an army surplus transmitter. Almost immediately the magazine came out, I received two manuals, one from Peter VK2EMU and one from Ken VK4DKM.

I would like to thank both these gentlemen for their generosity and their display of the best of the amateur spirit. With an extra manual I was able to pass one on to another operator.

If you ever feel a little cynical about human nature, this is the sort of thing to restore your faith in it. Thanks again.

**John Faulkner VK2DWW**  
**PO Box 57**  
**Bexley North NSW 2207**

### QRP Awards (1000 Miles/Watt)

I thought you might be interested to hear that I have recently received three "1000-Mile-Per-Watt" awards. The award is issued by the *QRP Amateur Radio Club International* in the USA for confirmed

contacts using less than five watts and where the distance divided by the power equals or exceeds 1000 miles per watt. The awards I received were for the following confirmed contacts:

HK5BEG Cale, Columbia, 4 April 1994, 14 MHz, RST 579, 8,740 miles;  
XE1/KC5APT Veracruz, Mexico, 4 April 1994, 14 MHz, RST 559, 7,926 miles; and  
FE5VV Attignat, France, 28 August 1994, 14 MHz, RST 569, 10,584 miles.

All three contacts were made using 4.5 watts from a 20 metre version of the Tassie Devil, designed and built by Ian Smith VK8CW. The antenna was a rotatable trapped dipole about 15 metres high.

It proves, once again, that a little can go a long way!

**Peter Taylor VK4FV**  
**36 Sundance Way**  
**Runaway Bay QLD 4216**

### Assistance with Croker Island

We hope to activate Croker Island for IOTA purposes in August 1996. Every island around the world has an IOTA number when activated. Croker has never been activated, so would be a rare and new island to the world of amateur radio.

This project will be activating the island for seven days, 24 hours a day. The call sign is yet to be finalised, but we hope to obtain VK8CI from the SMA office in Darwin. Malcolm Johnson VK6LC/VK8LC will be the senior operator.

A special QSL card is in the process of being made up and all sponsors will have their logos on the QSL card.

We are looking at a cost of around \$2,000. We are not asking for this money from the

WIA but are going to ask other groups such as JARL, ARRL, Yaesu, IOTA, Dick Smith, RSGB and many more. Any assistance the WIA or members could provide would be of great help to us. I am a full member of the WIA and have been since I was licensed.

I, Stuart, can be contacted by phone on (089) 635 530; and Bob can be contacted on (089) 279 381.

**Bob Finlayson (SWL)**  
**Stuart Birkin VK8NSB**  
**PO Box 205**  
**Karama NT 0812**

### Can You Help?

Recently I visited Cape Otway and found that guided tours are being given over the lighthouse area. When I mentioned my presence there at 13 RDF station (later No 13 Radar) during the Second World War, the remains of the concrete building which housed the radar were included in the tour. The guide asked me to give a short talk and later to send any relevant material in my possession. This has been done and all the staff there found it most interesting. The information sent included copies of prints of an LW/AW receiver and an LW/AW installation in a tent showing the "fly swatter" antenna.

Here comes the question. Does anyone have photos of the station showing buildings and possibly layout? If they do, may I have copies of them or a loan of any negatives, please? I will be glad to refund any expenses involved.

For the information of anyone who was there, the whole area is now overgrown with two metre plus shrubs and all that is readily visible is the concrete walls of the "doover" installation building with only the massive gear and shaft which were used for rotating the antenna. The antenna shaft was cut off at roof level with an oxy torch.

**Neil Trainor VK3IJ**  
**133 Bladin Street**  
**ar**

**When you buy something from  
one of our advertisers, tell  
them you read about it in the  
WIA Amateur Radio magazine**

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# Repeater Link

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Will McGhie VK6UU\*

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## Repeater Licences

In VK6 we have just renewed all repeater licences that WARG hold. It appears that the SMA are having some difficulty with records of existing repeaters and links. I have heard and read from several sources that some of the SMA's records on amateur repeaters are not available. This is making it difficult when it comes to re-licensing.

## CTCSS

CTCSS is five letters you see often in relation to FM communication and voice repeaters. I'm sure many of you understand its application and use, but I'm equally sure there are many of us that have a lack of understanding of CTCSS.

## CTCSS Stands For

The most obvious question is what does this odd collection of letters stand for? CTCSS is short for, Continuous Tone Coded Squelch System. Quite a mouth full. Other labels are used such as Code Guard and Sub Tone to describe this mute system for FM receivers.

## Not Perfect

As mentioned in last month's *Repeater Link*, a squelch (mute) system is required for FM operation. The FM receiver, when not receiving a signal, produces a large amount of noise out of the speaker. Without a squelch to turn off the noise in the absence of a signal, monitoring on an FM receiver is very tedious.

CTCSS is a better mute system than the standard mute. So what is wrong with the standard mute as found in FM receivers? The answer is, it is not perfect. As good as it is, it can still be falsely triggered by all sorts of interference. These include interference from all manner of electronic devices. In particular, when mobile, where you are driving past a wide variety of interference sources, the mute will open. Added to this is receiver overload and, in particular, the pager.

## Pagers Again

Since the introduction of pagers, with no guard band between them and our two metre band, mobile and base operation on two metres FM in much of Australia's populated areas has become difficult. There are areas where the sheer power and number of pager transmissions makes two metre operation impossible. In Perth, one such area is on the western side of the central city area. While

driving through this area the two metre mobile is unusable, with almost continuous interference. The standard mute remains open most of the time, with loud pager noises.

## CTCSS Operation

So how does a CTCSS mute system handle this situation? With the normal mute, operation in these areas is very difficult, but with the receiver using the CTCSS mute, operation is only slightly affected. There are two aspects to pager interference when operating mobile in such areas. They are when there is an amateur signal and when there is not.

### Situation 1

If you are driving through "pager alley" and there is no amateur signal on the channel you are tuned to, with the standard mute you are bombarded with pager audio coming and going. Very annoying, and you either put up with it, or turn the audio down or off. With CTCSS operating there is no pager audio. The receiver remains tightly muted and you hear nothing.

### Situation 2

This is where there is an amateur signal, such as a repeater signal encoded with CTCSS. There is a difference between the operation of the two mute systems in this situation, albeit subtle at times. If the amateur signal is stronger than the pager interference, with both systems you hear the same result, the amateur audio. If the pager signal is stronger you hear the pager with the normal mute, but with CTCSS you hear nothing, the pager signal is muted out. This is preferable to being blasted with pager noise. In practice the brief breaks in audio when the pager is stronger can almost go unnoticed with CTCSS.

## Works Well

CTCSS works very well. No longer are you besieged by interference from all sides. What you hear is what you want to hear, the amateur transmission.

## Work

So how does CTCSS work? This system requires a low frequency tone between 67 Hz and 250 Hz to be added to the transmission. This tone is then detected and decoded at the receive end, and operates a switch to connect the audio to the volume control, and hence the loud speaker. No tone no audio. Correct tone, audio.

A low frequency tone was required so it would not be heard. This is not entirely true, as depending on the receiver and speaker size, CTCSS tones can be heard, albeit at a low level. Modern receivers have a low-cut audio filter fitted to eliminate the CTCSS tones from reaching the speaker.

## Encoding

The CTCSS encoded tone at the transmitter is adjusted to be about 10% of the normal audio. This means, in a 5 kHz deviation system, the CTCSS level is set for 500 Hz deviation. From an installation point of view, the CTCSS tone must be injected after the mike amplifier. These low frequencies do not make it through the low-cut filter in the mike amplifier circuit. This does make the installation of CTCSS to a transmitter more difficult than DTMF tones, which can be applied to the mike input.

## Decoding

Decoding of the tone by a suitable decoder produces a logic output that is used to gate the receive audio on and off. The modern CTCSS decoder is very sensitive and can decode a tone with a signal-to-noise of just a few dB. The CTCSS decoder is as sensitive as the normal mute, opening on signals that have little intelligible audio.

## Make Your Own

If you have a converted commercial FM transceiver that is not fitted with CTCSS decode or encode, you can make and install your own. The other option is to buy a ready made CTCSS board. SIGTEC make a number of these boards that are very small and work well. However, the cost may put you off at around \$100.

If you want to make your own, I will provide a couple of circuits in next month's *Repeater Link*, one of a decoder and the other of an encoder. Both circuits use the NE 567 IC. It is not easy to make an encoder. The low frequency tone has to be a good sine wave, with a stable frequency. Making a 123 Hz oscillator that will stay within 0.2 of a Hertz is surprisingly difficult.

## CTCSS Frequencies

67.0, 71.9, 74.4, 77.0, 79.7, 82.5, 85.4, 88.5, 91.5, 94.8, 97.4, 100.0, 103.5, 107.2, 110.9, 114.8, 118.8, 123.0, 127.3, 131.8, 136.5, 141.3, 146.2, 151.4, 156.7, 162.2, 167.9, 173.8, 179.9, 186.2, 192.8, 203.5, 210.7, 218.1, 225.7, 233.6, 241.8, 250.3 Hz.

## Strange Frequencies

The choice of the different frequencies used for CTCSS does look a little odd. The reason is to have as many tones as could be put into the window between 67 Hz and 250 Hz, and still be successfully separated and



decoded. Also, none of them can be harmonically related. A decoder on say 140 Hz could decode a 70 Hz tone, due to the presence of the second harmonic on 140 Hz.

## Standards

The WIA, a few years ago, advised that 123 Hz should be used if a repeater requires to have a CTCSS decoder fitted on the receiver, due to interference to the repeater. This would require the user to encode his/her transmission with 123 Hz.

In VK6, several of our repeaters are encoded with 123 Hz. That is, the repeater's transmission has a 123 Hz tone for users to run their receivers in the CTCSS mode. May I suggest that, in order to standardise, when fitted, all repeaters transmit 123 Hz. No

repeaters in VK6 require the user to transmit 123 Hz to access a repeater. The need is there on several of our repeaters, but due to most amateurs not having CTCSS encode capability, the requirement has not been installed. It is a chicken and egg situation.

To start the ball rolling, make the effort on your repeater and install 123 Hz encode on the transmission. Users then are encouraged to experiment with this useful facility.

The sooner CTCSS is used both ways, between repeater and user, the sooner much of the paper, and other, forms of interference will be less of a problem.

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VK6UU @ VK6BBR

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not be elaborate; its main purpose is to provide capacitance to the earth and minimise the contact resistance, so that the total resistance seen by each leg is not too dependent on local ground conductivity.

Finally, I would recommend to anyone considering building a vee antenna to first model it with an antenna modelling program, preferably one which can automatically optimise the antenna dimensions to achieve a specified result. For example, starting off from the length and apex angle published in the ARRL Antenna Handbook (10th Edition) for a two wavelength unterminated vee, I was able, with Mininec, to significantly increase the gain and F/B ratio by increasing the leg length 11%, and reducing the apex angle from 73° to 59.5°. As my version of Mininec does not contain an optimisation routine, these results took a lot of tedious trial and error, so even better results are probably obtainable.

An interesting result was the discovery that the gain of the unterminated vee (in free space) appears to peak around a leg length of four wavelengths, and fall off at longer lengths. This conflicts with the ARRL Antenna Handbook, which shows vee antenna gain increasing monotonically with leg length. The Handbook concedes, however, that mutual impedance between the wires has not been taken into account. It appears that with long leg lengths, the effect of mutual impedance may have a more disastrous effect on gain than originally thought. However, this does not appear to be too much of a problem with shorter vees (ie up to four wavelengths). I have yet to perform a similar investigation into the terminated vee, but would not be surprised to find a similar peaking of gain.

The Handbook also advises: "for the same total wire length, the rhombic gives greater gain than the vee ... the directional pattern is less affected by frequency when used over a wide frequency range. The disadvantage is that additional supports are required."

Much further work needs to be done, but it appears that for leg lengths up to four wavelengths, one has the choice of the vee for ease of construction, or the rhombic for ultimate performance; but for lengths greater than four wavelengths, the rhombic looks like the only sensible choice.

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## Technical Correspondence

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*All technical correspondence from members will be considered for publication, but should be less than 300 words.*

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### Vee Antenna Gain

The articles by Rob Gurr VK5RG on HF antennas have been interesting and informative. However, some readers might have been puzzled how the gain of a vee antenna could increase by "up to 3 dB" by adding resistive terminations (page 7 of April 1996 *Amateur Radio*). The follow-up note (page 15 of May 1996 *Amateur Radio*) provided partial explanation but, without wishing to detract from Rob's excellent work, I thought further explanation of vee antenna gain was warranted.

In its basic form, the legs of the vee antenna are unterminated. This makes the antenna resonant, causing it to have a limited operating bandwidth. Away from resonance, the reactive component of the feedpoint impedance rises rapidly, making it difficult to drive the antenna efficiently. This reactance vs frequency characteristic is steeper than that of a half wave dipole, because the legs are several times longer than those of a dipole, and thus go out of tune more quickly. In addition, the unterminated vee is bidirectional, albeit somewhat unsymmetrical.

However, if the legs are terminated, the antenna becomes non-resonant, and is much easier to drive across a broad bandwidth. Providing the terminating resistors are reasonably well matched to the leg impedance, the feedpoint impedance will remain essentially resistive with frequency

variations. The absence of reflections from the ends of the legs also causes most of the reverse lobe to disappear, and the directive gain to be up to 3 dB greater. However, up to half the total input power will be dissipated in the terminating resistors, causing the total antenna loss to increase by up to 3 dB. One factor balances the other, and the overall result is that in the forward direction, the radiated field strength will remain largely unchanged.

The reason we say "up to 3 dB" is that the vee antenna is already partially unidirectional. For example, Mininec shows that if the legs are four wavelengths long, the directivity will be 8.3 dBd and the F/B ratio 2.4 dB. Even in the most optimistic case, if we were able to terminate the legs to ensure complete cancellation of the rear lobe (ie infinite F/B ratio), the most the directivity could rise would be 1.99 dB.

Regarding the "20 m Delta V" antenna shown in Figure 15 of the April article, the wires between the legs and the terminating resistor will behave as an end fed dipole, creating unwanted sidelobes and spoiling the F/B ratio. The same applies to the antenna shown in Figure 14, although the pattern degradation will be much less if the wire is close to the ground or buried. A better approach, used commercially, is to bury a ground screen under each resistor. Due to the high resistances involved, the screen need

# VHF/UHF - An Expanding World

Eric Jamieson VK5LP\*

All times are UTC.

After the mass of reporting for the April and May issues regarding the sustained tropospheric opening between Perth and Mount Gambier/Melbourne, this month is decidedly low-key.

## From VK6

Frank VK6DM refers to the recent tropospheric opening saying: *You certainly have a comprehensive report. It was an unusual opening. I heard nothing of the Adelaide two metre beacon, yet Mt Gambier two metre beacon was almost continuous.*

*I cannot work much DX as I am seven km west of Wal VK6WG at Albany. I live on a farm, and have about +2 degree horizon in your direction. Have only two m & 70 cm gear. Did contact you once on two metres many years ago.*

*Note that the distance 1760 km for VK5DK to myself is not correct, it should be approx seven km more than Wally VK6WG. [Distances were only approximate, as stated ... VK5LP.] This would be about 15 km less than Wal VK6KZ/p on Torbay Hill. It was very interesting with Wal there, I could call him almost any time to see how he was going. One morning when I couldn't hear anything here in the valley, Wal reported that he could hear beacons on all bands to 3.4 GHz. So, if you want to work DX then you first choose the site!*

## Contacts on 24 GHz

In the January issue I referred to a possible 24 GHz contact involving Ashley VK2XSO. Thanks to Tony VK2TJF who initiated contact with Ashley, and to Wal VK6KZ, who managed to reach Ashley and received the following reply:

*Yes, I have been active on 24 GHz. I haven't had any QSOs near 400 km! That would be inherent of narrow-band gear, which I don't have for 24 GHz, yet.*

*The best results I've had so far have been 40 km from Kurralong on the edge of Sydney down to Castle Hill. That has been wide-band FM using klystron driven tellurometers. I also had some 24 GHz Gunn diode systems but I haven't tested them over any large distances.*

*Can't say I can remember the last time I dragged out the 24 GHz stuff, but was about 18 months ago. The 40 km path in question is always clear, and it would have to be raining or very humid for any sort of drop in signal. It could easily be repeated any day.*

*I did have other longer paths to test (58 and 80 km) but I haven't tried them. I have no doubt the system will work over those paths if attempted. I'm a long way off a world record and haven't bothered to enter QSLs for it because I'm too lazy!*

*The tellurometer is a 24 GHz klystron with some weird complex circular polarised waveguide and the antenna is a one foot cassegrain feed dish which is moulded into the case. Otherwise, they look like the 10 GHz versions. The other 24 GHz Gunn diode equipment comes from mutilated radar detectors.*

## New Beacons

Don VK6HK advises: *That from 18 April 1996 a new 50 and 144 MHz beacon service commenced continuous operation from a location near Bunbury, Western Australia, locator OF76.*

*The transmitters have been established on 50.306 and 144.560 MHz with the particular long term aim of providing a useful signal level for the investigation of propagation to the west towards Africa across the Indian Ocean. The effective radiated power on a bearing of 260 degrees is approximately 100 W, horizontally polarised. About 10 W ERP is radiated on the reciprocal bearing of 080 degrees true. The antennas are three and four element Yagis respectively, mounted 25 m above ground. The site is about 300 m above sea level, with the Indian Ocean as horizon at about 20 km distant.*

*The "rear" lobe should provide a useful signal towards the Eastern States of Australia. The keying mode is on-off on 50.306 and FSK on 144.560 MHz. The latter is key down on 144.560 MHz, with key up 800 Hz lower.*

*The keying cycle is somewhat different from normal. It is VK6RBU, long dash, followed by 10 seconds of 5 mS pulses spaced 100 mS. The purpose is to provide the basis for individuals to experiment with looking for backscatter echoes from reflecting media, by displaying the signal on a CRO. The same keyer is used on 50 and 144, so the 144 signal might be used to trigger the display of 50 MHz echoes, and so determine the distance away that these are occurring.*

*Any reports of these transmitters to VK6HK, QTHR or packet VK6HK@VK6BBR.PER.WA.AUS.OC please.*

## New Zealand

Cliff ZL1MQ was to float my idea of a VK and ZL calling frequency of 50.130 MHz in the April issue of *Break In*. It will be interesting to see how much feedback results, as the idea in VK was broken only by the deafening silence!

Cliff also writes: *They have a Sunday night band report on 3.820 MHz, with ZL1 and ZL2 as regulars and occasionally ZL3 and ZL4. ZL2CD can no longer operate from Wellington due to TVI and Channel 1 TV. Those in a Channel 1 area can operate only from 51 MHz up, with some doing quite well using 50 MHz receive and 51 MHz transmit. Those who had a permit to operate on 50 MHz in October 1995 were required to sign a 20 year agreement, expiring October 2015, with the licensing authority, that they would transmit on a non-interference basis to television.*

*TVNZ bought second-hand Channel 1 transmitters in 1995, we can only guess that they came from VK when Channel 0 was closed, so it appears we are "stuck" with Channel 1 for twenty years!*

## VK2FLR Reports

The following was received from Mike VK2FLR and, unfortunately, had to be held over due to the mass of tropospheric reporting during April and May.

*Mike reports that: The summer DX season produced a fair swag of Es on 144 MHz. One of the best was to VK2FZ4 on 20/1 with 5x7 signals both ways. At just over 800 km this constitutes the shortest skip I have heard on 144 MHz.*

*I again operated from Tumut between Christmas and New Year with the usual aircraft-enhanced signals on 144 and 432 into Sydney, Canberra and Melbourne, sometimes simultaneously. The portable operation was an FT736 with 25 watts on both bands to a six element Yagi on two metres and a 15 element NBS Yagi on 70 cm.*

*On the ARRL EME scene I was on for the October session but, because the North American window coincided with early evening prime time TV in eastern Australia, I was restricted to the European window, working five stations.*

*EME conditions have not been good in recent months as the Faraday rotation seems much slower now that we are approaching solar minimum. Until recently, Faraday could be relied upon to rotate every 60-90 minutes or so, producing reasonable signals for at least part of the time. But it is now common to be locked out for the whole of a typical three hour window to Europe or the Eastern US. Of course, sometimes it works*

the other way and you can be locked in for hours!

During the VHF Field Day I had a random meteor scatter attempt with Alan VK5BW/p. The contact nearly came off as Alan had copied both callsigns and was sending me reports when he lost power half way through the one hour sked. A pity as it might have stirred some of the VK5s to try the mode.

Since VK5VF on 144.450 MHz can be heard via meteors in Sydney, any VK5 running about 100 watts to a 10 element Yagi or better should have no trouble completing a meteor scatter contact.

One item of interest is the welcome return of Rod VK2BQJ at Oyster Bay. Rod is slowly getting things together again for 432 and 1296 MHz. He has participated in a recent bulk order for 1296 transverter kits from VK5 Division, which should result in several new Sydney stations on 1296 MHz.

## Six Metre Tropo Scatter

John VK3ATQ phoned to say he has been conducting six metre scatter experiments every weekend for years. He runs 100 watts to a six element NBS Yagi at 23 m on 50.115 MHz before work, between 7.15 and 7.30 EST (2115 to 2130 UTC). Andrew VK7XR is usually 5x1, but sometimes CW is necessary over the 400 km path.

He frequently works Rob VK2TWR at 450 km despite Rob running only 10 watts to a five element at 30 m, soon to be upgraded to 100 watts. Rob at Nimmitabel is 1000 m ASL and this probably accounts for the contacts. Signals are around 3x1 on SSB and 519 on CW. Falling snow will prevent contacts to Rob, but snow on the ground is no problem.

I queried these 10 watt contacts between John and Rob as they almost seem like groundwave, the low power tending to rule out scatter contacts. John replied that Rob's location is similar to that of a prime portable site and we all know what elevation can do to enhance VHF signals. Whatever the mode, they are being made consistently.

Other possible contacts are Rob VK3DEM, John VK3BQF, Mark VK2EMA and Eddie VK1VP, the latter worked recently. Another interested station is Andrew VK2ANS in Sydney.

John urges others to try this mode. The paths to 400 km are usually reliable but the signals not strong; however, not knowing who may be heard, makes the effort worthwhile.

John also said that Frank VK7ZMF lost his 16 m (50 foot) DL6WU six metre Yagi in a recent gale. However, by Christmas he expects to have a pair of these Yagis operational! The mind boggles at the wind

loading such a system presents, but we wish Frank well; their performance should be exceptional. [I am pleased to say my long-boom six element withstood a recent 140 km/h gust without damage - thankfully it was pointed in the right direction for maximum protection ... VK5LP.]

New VK2QF sent a fax to say he has changed houses in the same Hargraves area but is without a shack or antennas. However, forward planning indicates a shack and three towers will be in service by March 1998. His main interest will be six metres and for this he will use a long Yagi at 24 metres.

Rod VK2TWR, apart from having successful low power contacts on six metres, is also active on 144 and 432 MHz. On 1/2 at 2315 he worked John VK4FNQ in Townsville 5x8 on 144 MHz Es. 14/2: 2048 VK7XR on both bands, and again on 15/2. On 24/3 there was a small six metre opening and VK2TWR worked VK4BRG and VK4CJW. 30/4: 1040 VK7XR 5x3; 3/5: VK7XR 5x1, both contacts on 144 MHz and the distance 680 km.

## TEP Contacts

Graham VK6RO reports that on 19/4 between 0600 and 0625 he worked JA0, JA1 and JA2 areas with signals to 599. At the same time, TV carriers were noted on 48.240, 48.250, 49.750, 55.250 and 57.750 MHz. The contacts appeared to result from an Es extension as one JA reported he had Es to Taiwan.

John VK4KK reports intermittent JA contacts into Brisbane, and John VK4FNQ reports the same for the Townsville area. Based on previous years it seems likely that there will be increased JA TEP activity next October, with successive years providing more contacts each equinox. Phil VK5AKK also worked JA.

## Two Metres

Rob VK3DEM at Bairnsdale sent a fax to say that on 19/1 he worked ZL3TLG 5x2, and on 21/1 ZL1TWR 5x3-5 at a distance of 2459.4 km, ZL3AIC 5x5, copies of QSL cards sighted.

A set of good conditions on 20/4 produced the following contacts on 144.200: VK1BG 5x4, VK1BUT 5x1, VK1DO 5x5, VK2BAF 5x2, VK2BWT 5x4, VK2TWR 5x7, VK2ZAB 5x3, VK3AJN 5x9, VK3AMZ 5x5; on 21/4: VK1BG 5x8, VK1DO 5x7, VK1VP 5x5, VK2BBF 5x2, VK2BIT 5x2, VK2BWT 5x3, VK2ZAB 5x2, VK3AUU 5x8.

A dispatch from VK4IF/VK4JSR reports that: *Strong Meteor Scatter "pings" have been received from stations on 144 MHz to the south of VK4. On 3/5 in Brisbane, VK2TWR was heard 5x9 for 15 seconds and*

*VK3AUU was 5x5 for five seconds. On 4/5 VK3AMZ was 5x7 for five seconds. These are UTC days and the time between 2200 and 2230. Apart from these strong bursts, several small "pings" were received during the morning.*

Ron VK3AFW also sent a report of 144 MHz contacts made via meteors: 3/5: VK3AUU worked VK2DVZ. On 4/5 VK3AUU to VK2DVZ, VK3AMZ to VK2DVZ and VK2DXZ, VK3BRZ to VK2DVZ, all reports S5, time 2200. A tropo contact between VK7XR and VK2TWR occurred on 29/4.

In addition, some of Ron's contacts have been: 3/4 2210 to VK7XR 5x3 tropo; 5/4 2021 VK4OE meteor; 24/4: 2247 VK1BG, 2256 VK1DO 5x2, 2257 VK2BIT 5x1, 2303 VK1BUC 5x7, all via aircraft enhancement.

## Europe

I have just received the April news sheet from Ted Collins G4UPS, and he asks that wide distribution be given to the following: *The club station of the European Radio Communication Agency, located in Copenhagen, Denmark at grid JO65hq, will soon be on six metres with the exotic callsign 5PIER. The station will run 100 watts to a six element Cushcraft antenna from a tower 15 m above the roof of the five storey building in which the Agency is situated.*

Although the European Agency is on sovereign territory, this station does not count as a separate entity for DXCC, but rather as a unique Danish station. Knowing this, a pile-up should be avoided when F2 next allows the station to be heard.

First Es in Europe for the year available on 21-27-28/4 with contacts to DL, EH, F, HA, I, OE, OH, OK, OZ, SM, SP and YL. That's twelve countries for openers!

## Lack of Packet News

For some time I have wondered why I never see anything on my packet system relating to VHFSIX, or SIX NEWS, 50 MHz, etc. For some reason it is not being listed for me and others in VK5 to read. John VK4FNQ sent me a copy of the message list for the past couple of months, and there are scores of messages listed which I could sort through and use in the compilation of my notes.

Until I find out what is going on, John has kindly offered to send me copies of the information I need. I just hope, that for whatever reason, the appropriate information is not being deliberately filtered out at some point in the message path. But it seems very strange that only the VHF information is missing, everything else appears to be there, including general information from overseas, Australia and

New Zealand. After the expense of installing a packet system, I am not privy to all that appears on it. Why?

## Internet Six News

Courtesy of John VK4FNQ, I have received with thanks the April copy of *Internet Six News* which originates from Geoff GJ4ICD in Jersey. I am grateful to at least be receiving this information.

1/4: VK3SIX on 28 and 50 MHz have closed down for the time being.

3/4: e-mail pages: Geoff GJ4ICD says: *We shall be introducing the 50 MHz Email listing soon as a separate 50 MHz page on Internet Six News....we already have over 3000 Email addresses for 50 MHz but no callsigns as they are on our mailer, therefore, could all 50 MHz amateurs send a one line Email with their: Call, Name, Email address to: equinox@itl.net.*

4/4: SV9SIX beacon is off the air for an undefined period. VP2EA on 50.012 is again operational.

13/4: VK4FNQ reports JA beacons at 0915 - JA2IGY, JA66YBR. Heard JA6TEW calling. TV video on 49.745, 49.750.

14/4: JAs to VK - 0803 VK8RH, 0805 VK5AKK, 0811 VK8MS, 0824 VK5ZBK.

26/4: SK3SIX beacon off due to snowstorm which destroyed the antenna and transmitter on the mountain site.

28/4: Bob WA1OUB reports that: *He copied very weak 48.250 European video from 1400 to 1420. Signals peaked to S1 with what appeared to be meteor enhancement which is typical of a partially open (triple hop) path. This is quite early in the season and may be an indicator of good things to come.*

## Closure

Remember that June and July are months when it is not unusual for Es to appear, most commonly on six metres.

Closing with two thoughts for the month:

1. Education is the ability to listen to almost anything without losing your temper or your self-confidence; and

2. The reward of a thing well done is to have done it.

## 73 from The Voice by the Lake.

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Packet: VKSLP@VKS.WI.RADL.RSA.AUS.OZ

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# Spotlight on SWLing

Robin L Harwood VK7RH\*

Please note that there are changes to my postal and e-mail address. My postal address now is 5 Helen Street, Newstead TAS 7250. My Internet provider suddenly went out of business and didn't give much warning to the hundreds of subscribers. This meant that I hurriedly had to scramble to a more reliable source. I am now with an excellent server with faster connections than was previously available. This is especially noticeable on the Web and downloading relevant information is much quicker.

There are over 30 major international shortwave broadcasters who now have a presence on the Web. It is fairly easy now to click and retrieve schedules, compared to looking through Newsgroups such as "rec.radio.shortwave" or "rec.radio.info". These sources do continue but mainly contain comments from listeners and/or broadcasters on related topics. Some frequency information is still readily available.

Not all Internet users, however, readily

obtain access to the World Wide Web. Newsgroups are text-based, while Web sites (or home pages) are usually graphics. This means that it often takes longer to download information from a home page which includes graphics. However, many sites do have a text-only facility and it can save time (and money) by clicking on at that point.

Some broadcasters are also placing audio from their programming in various formats on these sites. Most of these are in the Real Audio format and, before you can access files, you must have that necessary software readily available. If you don't have this, there usually is a pointer to the relevant site for you to retrieve it. The audio quality is variable and certainly not hi-fi. It can be garbled, due primarily to congestion on the Net.

Little audio clips are useful, especially for Interval Signals and Identification announcements. I have heard these from Radio Liberty. Another widely used format on the Net is .wav files. I have often taken short audio news clips in this format from CNN but I was recently caught while downloading the English news from the VOA in Washington. After 20 minutes and roughly three megabytes, with no sign of when the file would end, I disconnected. It is much easier listening to the 10 minute bulletin direct on shortwave!

I have an apology to the Southern Cross DX Club in Adelaide. In last month's column I reported that the future of the club was in question and that their monthly "DX Post" had been cut back to bi-monthly. I can now report that the Club's future is assured and, thanks to the membership who have rallied around, "DX Post" will revert to being monthly as from this month.

Bravo! Those who, fortunately, have Internet access are indeed able to follow what is happening, yet the majority of listeners and DXers rely on their monthly magazines to keep abreast of developments. Their address is GPO Box 1485, Adelaide SA 5001 and the subscription is \$AUS28.00 per annum.

I notice that Radio Ulan Bator in Mongolia is heard on 12085 kHz between 1200 and 1300 UTC in English. It is directed to Australia and SE Asia. A parallel frequency of 9745 kHz was quoted but not heard here. The announcers appeared to be British or Australian which made for better listening as the modulation was terrible, yet the signal of the carrier is quite strong. They also announced a 0900 UTC release on 12085 and 11850 kHz.

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## VK QSL BUREAUX

The official list of VK QSL Bureaux. All are Inwards and Outwards unless otherwise stated.

VK1	GPO Box 600 CANBERRA ACT 2601
VK2	PO Box 73 TERALBA NSW 2284
VK3	Inwards Box 757G, GPO MELBOURNE VIC 3001
	Outwards 40G Victory Blvd ASHBURTON VIC 3147
VK4	GPO Box 638 BRISBANE QLD 4001
VK5	PO Box 10092 Gouger St ADELAIDE SA 5001
VK6	GPO Box F319 PERTH WA 6001
VK7	GPO Box 371D HOBART TAS 7001
VK8	C/o H G Andersson VK8HA Box 619 HUMPTY DOO NT 0836
VK9/VK0	C/o Neil Penfold VK6NE 2 Moss Court KINGSLEY WA 6026

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## What's New

Bob Tait VK3UI\* introduces new products of interest to radio amateurs

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### JCK Neck Microphone IC-X07

DAYCOM Communications Pty Ltd supplied this interesting microphone to test.

I have to say that it is a little different to the old throat microphones of yesteryear.

As I drive a vehicle which has an ambient noise level of around 80 dBA at around 80 kph, I was keen to try it out. On air reports could not detect any apparent vehicle noise; however, I did receive reports that the audio was a little deeper than usual. Most of my contacts were surprised to learn that I was using this little microphone.

The assembly comprises a spring ring, which is hinged in the centre, and at the end of this ring is an electret microphone. A short fly lead from the microphone housing has an earphone attached which allows the microphone to be clipped around your neck with the earphone in your left ear. The received audio response was similar to my Walkman. At 100 kph it got a bit noisy, but I could still copy the local repeater.

Also attached to the microphone housing is the main cable which has a PTT attached to it at about waist level. At the end of this cable is the standard handheld connector used on Yaesu, Kenwood, Alinco and Icom rigs. In the side of the PTT switch is a socket for an extension PTT which allows a finger operated PTT to be interfaced. The normal PTT has a belt clip for attachment to a trouser belt if required.

When attached the microphone sits to the left of your throat. I found that it was very comfortable to wear, even for up to an hour. I also tried the IC-X07 whilst bicycle mobile and pedestrian mobile and found it easy to use.

The IC-X07 is available from Daycom Communications Pty Ltd at \$79.50.

### MFJ-114X Giant Wall/Desk Mounted Clock

This unit is ideal for the short sighted, or for those visitors who won't take the hint and go home at a reasonable hour. With the readout at 60 mm high the numerals are a bit hard to miss.

Time setting is very simple with one button which toggles between hours and minutes, and another for setting the figures. The procedure is then repeated for UTC.

A selector switch allows either local time or UTC to be selected. The display for local time is 12 hour format and for UTC is a 24 hour format. Two AA batteries provide a backup supply in case of a power failure;

during backup the LED displays are turned off to conserve power. The main power is provided by a 12 volt AC plug pack rated at 500 ma. This clock is covered by 12 months warranty.

The clock suffered from one annoying problem in that the display locked up if the mains supply was interrupted more than once within a period of 30 seconds. To reset the display, simply remove the backup batteries, then replace them and reset the time. This type of failure could occur if a vehicle ran into a local power pole where the supply is not immediately shut off.

This clock is available from Daycom Communications Pty Ltd at \$89.00.

### MFJ-864 HF/144/440 MHz SWR Bridge/Power Meter

The new MFJ-864 operates from 1.6 MHz to 60 MHz on HF, and on 144 and 440 MHz.

The band selection is provided by a simple six position switch. The meter is a single scale cross needle movement measuring 50 mm by 25 mm. It has two ranges for each band selected, the low power range being 0 to 30 watts for forward power and 0 to 6 watts reflected power.

On the high power range it is 0 to 300 watts forward power and 0 to 60 watts reflected power. This instrument incorporates two bridges, one for HF and one for VHF/UHF. This arrangement allows you to monitor both HF and VHF/UHF with the same unit.

If you are the proud owner of an IC706 or DX-70 the MFJ-864 is just the thing for you. An inbuilt meter lamp is provided for connection into the lighting circuit of your vehicle. On air tests on all HF bands, 144 to 148 MHz and 430 to 450 MHz, compared favourably with the readings obtained from my commercial units.

The MFJ-864 is available from Daycom Communications Pty Ltd at \$189.00.

\*Clo PO Box 2175, Caulfield Junction VIC 3161

ar

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## Silent Keys

*Due to space demands obituaries should be no longer than 200 words.*

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The WIA regrets to announce the recent passing of:-

K M (Ken)	CARLTON	VK3MCK
W J (Jim)	BERRY	VK4WB
W R	WOODLEY	VK6DJ

### William James Berry VK4WB

The writer knew Jim at Silkstone State School. We were both eight years old. His first involvement in radio was making a crystal set from a circuit drawn by his teacher.

In secondary school, Jim produced, as a project, a Micrometer Screw Gauge, an instrument he used up to the date of his decease.

Joseph Berry, Jim's father, was his first employer on a drilling rig test boring for Cracow Gold Mines and later the foundations for the Storey Bridge in Brisbane.

Several years of various jobs followed after leaving his father until finally, before WWII, Jim went into a reserved occupation as an instrument mechanic.

Post war, Jim started his own business repairing and maintaining taxi meters. This business he ran until his retirement five years ago. Most of the meter test instruments were designed and built by Jim, including those used when taxi meters became all electronic.

Jim was a keen motor-cyclist and regularly rode a modern fast machine up to the date of his 80th birthday. He will indeed be sadly missed by those who knew him. He died at his home from a burst aorta. Jim never married, claiming that he was always too busy to find a partner.

Jim was a consistent station each day on the well known Coral Coast Net, controlled by Les Bell VK4LZ at Airlie Beach. Jim will be sadly missed by everyone of the stations participating in that large group every day.

King Saxelby VK4ADS

ar

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## Update

### Page 21, Amateur Radio April 1996

The gremlins have been at work. The caption to the photograph in the ALARA column had VK9NL and VK6DE reversed. Bev VK6DE is seated and Kirsti VK9NL is standing. Our apologies for any confusion this mix-up may have caused.

It might be a good idea to correct your copy of the April 1996 issue of *Amateur Radio* now.

ar

# HF Predictions

Evan Jarman VK3ANI

These graphs show the predicted diurnal variation in key frequencies for the nominated circuits. They also indicate a possibility of communication (percentage).

The frequencies identified in the legend are:-

Maximum Useable Frequency (50%)

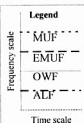
E layer MUF

Optimum Working Frequency (90%)

Absorption Limiting Frequency

The predictions were made by one of the Ionospheric Prediction Service Stand Alone Prediction Systems. The T index used is shown above the legend. The Australian terminal azimuth (degrees), path length (kilometres) and propagation modes are also given for each circuit. **ar**

T index:8



## Adelaide-Honolulu

First 3F 2-4 3E 0

Short

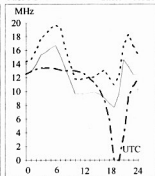
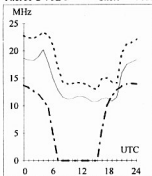
57

## Brisbane-Berne

First 0-5

Short 16321

315



## Adelaide-Marion Is

Second 4F 9-10 4E 0

Short

225

## Brisbane-Brasilia

First 0-5

Short

152

## Canberra-Amsterdam

First 0-5

Short

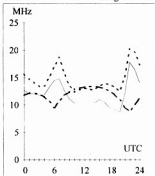
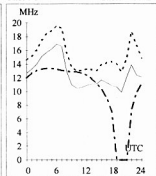
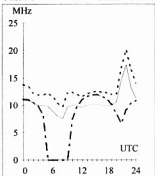
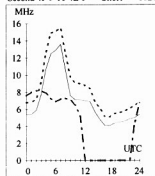
315

## Darwin-London

First 0-5

Long 26171

145



## Adelaide-MonteCarlo

First 0-5

Short

298

## Brisbane-Noumea

First 1F 13-18 1E 3

Short

70

## Canberra-Auckland

First 1F 6-8 1E 0

Short

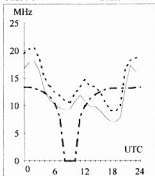
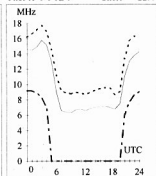
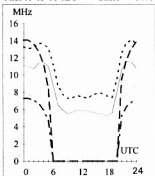
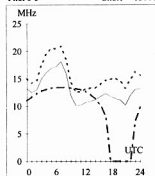
102

## Darwin-Louisville

First 0-5

Short 15400

45



## Adelaide-Montevideo

First 0-5

Short

167

## Brisbane-Vancouver

Second 4F 2-6 4E 0

Short

43

## Canberra-Auckland

Second 2F 19-22 2E 6

Short

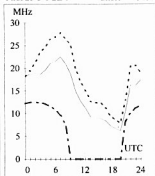
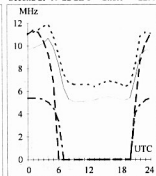
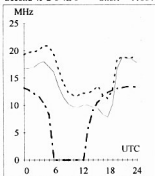
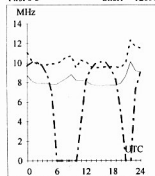
102

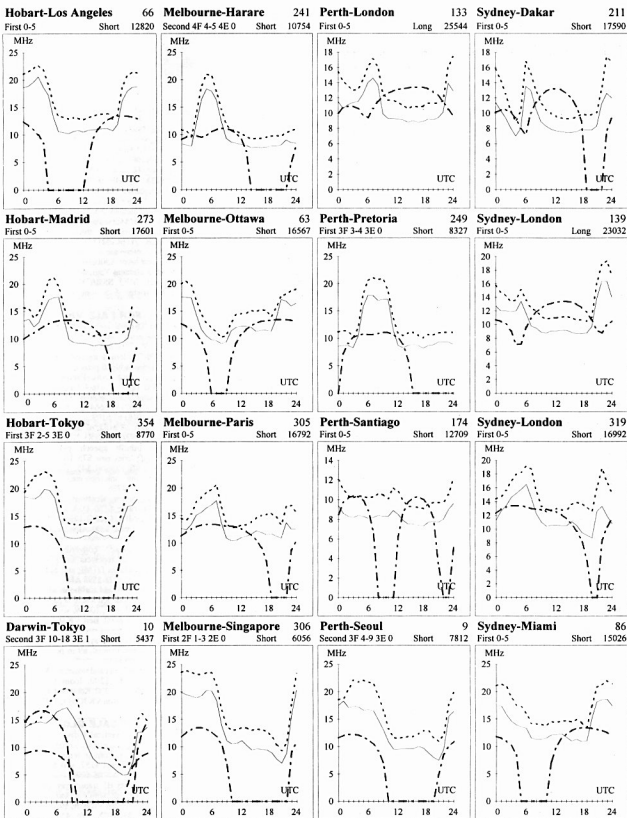
## Darwin-Tokyo

First 2F 3-8 2E 0

Short 5437

10





# HAMADS

## TRADE ADS

- **AMIDON FERRONMAGNETIC CORES:** For all RF applications. Send business size SASE for data/price to RJ & US Imports, PO Box 431, Kiama NSW 2533 (no enquiries at office please ... 14 Boany Ave Kiama). Dealers: at Geoff Wood Electronics, Sydney; Webb Electronics, Albury; Assoc TV Service, Hobart; Truscott's Electronic World, Melbourne and Mildura; Alpha Tango Products, Perth; Haven Electronics, Nowra; and WIA Equipment Supplies, Adelaide.
- **WEATHER FAX** programs for IBM XT/ATs \*\*\* "RADFAX2" \$35.00, is a high resolution shortwave weatherfax, Morse and RTTY receiving program. Suitable for CGA, EGA, VGA and Hercules cards (state which). Needs SSF HF radio and RADFAX decoder. \*\*\* "SATFAX" \$45.00, is a NOAA, Meteor and GMS weather satellite picture receiving program. Needs EGA or VGA & WEATHER FAX PC card, + 137 MHz Receiver. \*\*\* "MAXISAT" \$75.00 is similar to SATFAX but needs 2 MB of expanded memory (EMS 3.6 or 4.0) and 1024 x 768 SVGA card. All programs are on 5.25" or 3.5" disks (state which) needs supply documentation, add \$3.00 postage. ONLY from M Delahanty, 42 Villiers St, New Farm QLD 4005. Ph (07) 358 2785.
- **HAM LOG v3.1** - Acclaimed internationally as the best IBM logging program. Review samples....AR: "Recommend it to anyone"; The Canadian Amateur: "Beyond this reviewer's ability to do it justice. I cannot find anything to improve on. A breakthrough of computer technology". ARA: "Brilliant". Simple to use with full help, the professional HAM LOG is immensely popular (now in its 5th year), with many useful, superb features. Just \$59 (+\$5 P & P), with a 90 page manual. Special five hour Internet offer. Demos, brochures available. Robin Gandevia VK2VN (02) 369 2008 BH fax (02) 369 3069. Internet address: rhg@ozemail.com.au.
- **FERRITE SLEEVED BALUN:** Excellent performance when used in GSRV, dipole or beam antennas etc. 50 ohm, 1.5 - 30 MHz. Fitted eyebolts for use as centre insulator. SO239 (UHF) socket. Eliminates radiation from coax feedline. Helps reduce TVI, BCI, RFI and noise on receive. Maintains balance in antenna. Only \$64 (+\$5 p&p). Alpha Tango Products, Box 441, Kalamunda WA 6076. Ph (09) 294 4725.

## FOR SALE NSW

Deceased Estate of Steve Scott VK2FVB. HF Transceiver Ten Tec Corsair 2, s/n 56102625, \$1,500; HF Transceiver FT101 with 11 meters, s/n D114114, \$450; Yaesu FRG-7, \$80; HF Linear Amritron AL811, few hours use, \$800; Power supply 35 amp GME electrophone PSA1225, \$200; Morse keys, Air Ministry type D Ref 10F-7373, 70; Wood & Brass, 70; Desk mikes Shure, 2, of \$20 ea; Satellite Station FT290R all mode 2 m with 30 watt linear Toko Hipower HL- 30V, \$500; 2 Rotators with 2 m and 70 m beams, azimuth (Alliance) elevation (CDE), this station was very successful on OSCAR 10 and 13 with a 25 watt 70 rig, 4000; 2 m and 70 m pre-amps, Advanced Receiver Research SP144VDG, SP423VDG, \$100 each; Baycom mode, \$400; 2 m HT Icom 022E with speaker mike, \$150; VHF Admittance Bridge Wayne Kerr Labs type 8801, VHF Admittance bridge Wayne Kerr Labs type 8901, CRO Gossard CDU 150 CT531/3 6625 99 223 1190, \$700; RF Signal Generator oscillator Test no. 1 CT212; Power

supply variable 10 amp 0-15 V, 2, of \$50 ea; Micro Ammeter desk mount, \$15; Picolog A/D converter for PC with data logging software, used for antenna test range, \$50; Handi Counter model 2210A frequency counter 10 Hz-2.4 GHz, \$220; DC power shack distribution box metered, \$20; AVO D116 digital multimeter, \$40; Micronta analog multimeter, \$25; SWR meters Royce 2-098, \$30, Albrec Electronics 3.5-150 MHz, \$50, Unbranded 2 m, \$25; Transistor checker GSD #7, \$10, Homemade, \$20; Ammeter back mount, \$10; Reference amplifier, \$30; Drill press 1/3 hp 1/2" chuck on stand with roller support stand and 2 machine vises, \$150; BBC computer CPM, 2 drives, monitor, teletext reader, \$10. Contact Elsa on (049) 705 266 or Steve VK2SPT (049) 43 8208.

Kenwood TS430S, power supply PS430, tuner AT250, dip meter DM-81, SWR/PWR meter, Asahi ME-11X 80 m dipole, telescopic tube masts (3), all books, car mount, \$600 the lot. Geoff VK2POA (02) 416 8663.

Yaesu FT757GX with manual, mic, good cond, cont Rx, \$1050, s/n 081048; AT180 tuner, \$180 or both together, \$1,150 ono. M Tremble VK2BIS (02) 9971 5267 LAO.

Yaesu FT101B HF 100 W transceiver, manual, YD148 desk mike, \$350; MFJ901B antenna tuner, \$60; MFJ-815B HF pwr swr meter, \$70; 3 Ele 10 m beam, \$50; Hustler 5 band HF vertical, 90c; TV-Type rotator 240v, \$70; Shinau low-pass filter, \$20; Darrell VK2MNA QTHR (049) 33 2791.

Hills Teletower approx 45 feet, ready to erect, all guys, etc good condition; Daiwa rotator and cable; TH3JR with balun and coax in storage near Bateman's Bay, the lot \$350 ono. Geoff VK2EKP (02) 310 4294.

Shack Clearance, going overseas. TH6DXX beam, Daiwa rotator, 60 ft winch up Hills tower with Kevlar guys, \$950, all working, will separate; Power Supplies 12 V 15 A heavy stuff, 90c; Printers OKI Microline 80 & 84, A4 width and 15", \$35 each; Z80 based home computer, disk drives, can be machine code programmed, runs CPM, Wordstar, free to a good home. Household items, workshop tools, eg 10" sawbench & planer, bandsaw, pillar drill, sailboard. Cables, plugpacks, battery charger, bits and pieces at give away prices, arrange a visit, upon Sydney Northshore. Ted VK2EZQ (02) 477 7834.

Yaesu FT209RH 2 m handheld, new battery, case, YH2 headset with VOX, vgc, s/n 180658, \$320 ono; Alinco ALX2T 2 m handheld, s/n 31073328, new battery fitted, charging cradle, \$200 ono. Bruno VK2BPO QTHR (02) 713 1831.

Swan T1M 700CX, s/n 19372, power supply 230X, s/n 2253, xtal filter 16 pole, complete with circuits, spare valves 8950, \$500 near offer. H Chapman VK2BHC (02) 644 1929 Licd amateurs only.

Yaesu FT990, s/n 1C099231, all filters and MD1C8 mike, \$2,850; Coman tribander, \$350; Rotator 502SAX, \$250; Bencher iambic key, \$60; LP filter, \$50. All ex. Ian VK2UG (043) 92 1234.

Blower Fans for linear amplifiers with built in air filter and air flow switch, 2 1/2" x 3" outlet, quiet running, \$25. Ray VK2VF (063) 65 3410.

Hewlett Packard sig gen 608D 10-470 MHz, \$325; Philips amplifier AM17 class C 100 W linear 70-175 MHz, \$250; Marconi sig gen TF144 10 kHz - 72 MHz, \$295. Peter VK2CPK (02) 605 4790.

Quartz crystals 100 kHz Brookes type MO in

sealed glass envelopes, 14 mm dia x 65 mm long, wire lead connections, \$10 each. Phil (02) 871 1060 or (019) 90 4724.

Kenwood TS600 6 m all mode transceiver, s/n 710099, mic, manuals, \$350; Tokyo Hi Power 6 m W linear, HL86V, s/n 819604, preamp, \$175; Kenrotor KR400 rotator control unit, cable, \$200; Telegraph key Hi Mound BK100, \$100. All in vgc. Kevin VK2BKG QTHR (049) 82 2250.

Shack Clearance Sat mornings June 8 and 15, changing QTH, 2 and 6 m valve gear, ground planes, 40 and 80 wire antennas, 2 x 2 oregon mast, lifetime collection vintage "bits and pieces", Vidicon camera, PE cell gear, noise and distortion meter. Arthur Brown VK2IK QTHR (02) 876 1465.

Antenna 20 m monoband 3 element Yagi, perfect condition, cost over \$300, sell for \$175; 15 m monoband 3 element Yagi, \$35. Both for \$200, buyer collect. MFJ SSB/CW filter, \$55; HF SWR/PWR meter, \$25. John VK2KV (047) 87 7003.

## FOR SALE VIC

Kenwood TS140S 160-10 m 100 W with 30 memories and general coverage receiver, \$925. Bert VK3BH (03) 9857 9438.

ATN 13-30-8 8 element log periodic antenna, 13-30 MHz complete with all parts and accessories inc balun, manual, vgc, \$500; Frequency counter Topward TFC-1207 10 Hz-1 GHz variable gate times, attenuator, leads, manual, vgc, \$150. Bruce VK3WL, Lara, (052) 82 2664 AH or (03) 9480 0111 BH or Mobile (018) 67 6199.

FL110 linear, all band, as new, s/n 9E060241, \$275. Peter VK3NZG (059) 83 2702.

Magicon inbuilt speech processor suits Kenwood TS120 series, new, \$75; UHF dipole array 420-480 MHz, 3dB electrical, \$45; Yaesu FT272RA mobile, scanning microphone, \$200. Kerry VK3KFC (054) 60 4726.

Drake SSB communications receiver, \$150; Trio audio generator, \$150; Dick Smith laboratory oscilloscope 6.5 MHz, CAT Q-1280, \$200; Hustler 5BTV vertical antenna, \$200. Alan VK3TIV QTHR (054) 43 4750.

MTR8000 remote, converted to 6 m, programmed with all repeaters and simplex freqs Australia wide, includes DTMF and Sencall, \$200. Tony VK3ZOT (03) 9728 5598 AH.

Radio Amateur World Callbook on CD-ROM, latest version, \$35. Damien VK3CD (054) 27 3121.

Yaesu FT-77 HF xcvr, 100 W, with manual and mic, s/n 3E040763, \$400. Bert VK3DVI (052) 21 6804.

Yaesu FT-757GX, cat system transceiver with MD-1 desk mic and manual, all in pc, \$900. Dean VK3JBH (03) 9796 3128.

Yaesu FL-2100Z, all band linear, ex, \$700. Yaesu FL-12 15 amp PSU, \$200. Icom IC-2A HH, Spkr/mic, charger, etc, \$200. Kenwood TS-520S, etc with CW filter, \$375. Ron VK3OM QTHR (059) 44 3019.

## FOR SALE QLD

6 meter collinear vertical, 6 dBd, 4 radials, very good bandwidth, excellent construction and performer, made by Com-antenna, less than 6 months old, as new cost \$157, sell \$110. Bernie VK4EJ Strathpine (07) 3205 5098.

Kenwood TS940S HF transceiver with built-in ATU, s/n 9006269, vgc, with mic and manual, orig box, \$2,550 ono. Carsten VK4CIC (07) 3264 6443.

Packrat PK232MBX, s/n 45723, Packtor,



55

# WIA Divisions

The WIA consists of seven autonomous State Divisions. Each member of the WIA is a member of a Division, usually in their residential State or Territory, and each Division looks after amateur radio affairs within its area.

Division Address	Officers		Weekly News Broadcasts	1996 Fees
VK1 ACT Division GPO Box 600 Canberra ACT 2601	President Philip Rayner Secretary John Woolner Treasurer Bernie Copier	VK1PJ VK1ZAO VK1KOX	3.570 MHz LSB, 146.900 MHz FM each Sunday evening commencing at 8.00 pm local time. The broadcast text is available on packet, on Internet <a href="http://aus.radio.amateur.misc">aus.radio.amateur.misc</a> newsgroup, and on the VK1 Home Page <a href="http://email.nla.gov.au/~cmakin/wiaact.html">http://email.nla.gov.au/~cmakin/wiaact.html</a> From VK2WI 1.845, 3.595, 7.146*, 10.125, 24.950, 28.320, 29.120, 52.120, 52.525, 144.150, 147.000, 438.525, 1281.750 (* morning only) with relays to some of 14.160, 18.120, 21.170, 584.750 ATV sound. Many country regions relay on 2 m or 70 cm repeaters. Sunday 1000 and 1930. Highlights included in VK2AWX Newcastle news, Monday 1930 on 3.593 plus 10 m, 2 m, 70 cm, 23 cm. The broadcast text is available on the Internet newsgroup <a href="http://aus.radio.amateur.misc">aus.radio.amateur.misc</a> , and on packet radio.	(F) \$70.00 (G) (S) \$56.00 (X) \$42.00
VK2 NSW Division 109 Wigram St Parramatta NSW (PO Box 1066 Parramatta 2124 Phone (02) 689 2417 Freecall 1800 817 644 Fax (02) 633 1525	President Michael Corbin Secretary Eric Fossey Treasurer Eric Van De Weyer (Office hours Mon-Sat 11.00-14.00 Mon 1900-2100)	VK2YC VK2EYF VK2KUR		(F) \$66.75 (G) (S) \$53.40 (X) \$38.75
Web: <a href="http://sydney.dialix.oz.au/~wiansw">http://sydney.dialix.oz.au/~wiansw</a> e-mail address: <a href="mailto:wiansw@sydney.dialix.oz.au">wiansw@sydney.dialix.oz.au</a>				
VK3 Victorian Division 40G Victory Boulevard Ashburton Vic 3147 Phone (03) 9885 9261 Fax (03) 9885 9298	President Jim Linton Secretary Barry Wilton Treasurer Rob Hatley (Office hours Tue & Thur 0830-1530)	VK3PC VK3XV VK3NC	VK3BWI broadcasts on the 1st and 3rd Sunday of the month, starts 10.30 am. Primary frequencies 1.840 AM, 3.615 LSB, 7.085 LSB, and FM(R)s 146.700 Mt Dandenong, 147.250 Mt Macedon, 147.225 Mt Baw Baw, and 2 m FM(R)s VK3RMA, VK3RSH and VK3ROW 70 cm FM(R)s VK3ROU and VK3RGL. Major news under call VK3WI on Victorian packet BBS.	(F) \$72.00 (G) (S) \$58.00 (X) \$44.00
VK4 Queensland Division GPO Box 638 Brisbane QLD 4001 Phone (074) 96 4714	President Geoff Sanders Secretary John Stevens Treasurer John Presotto	VK4KEL VK4AFS VK4WX	1.825 MHz SSB, 3.605 MHz SSB, 7.118 MHz SSB, 14.342 MHz SSB, 28.400 MHz SSB, 29.220 MHz FM, 52.525 MHz FM, 146.700 MHz FM, 147.000 MHz FM, 438.525 MHz (Brisbane only), regional VHF/UHF repeaters at 0900 hrs Sunday. Repeated on 3.605 MHz SSB & 147.000 MHz FM, regional VHF/UHF repeaters at 1930 hrs EAST Monday. Broadcast news in text form on packet under WIAQ@VKNET.	(F) \$72.00 (G) (S) \$58.00 (X) \$44.00
VK5 South Australian Division 34 West Thebarton Rd Thebarton SA 5031 (GPO Box 1234 Adelaide SA 5001) Phone (08) 352 3428	President Peter Watts Secretary Maurie Hooper Treasurer Charles McEachern	VK5ZFW VK5EA VK5KDK	1827 kHz AM, 3.550 MHz LSB, 7.095 AM, 14.175 USB, 28.470 USB, 53.100 FM, 147.000 FM Adelaide, 146.700 FM Mid North, 146.800 FM Mildura, 146.825 FM Barossa Valley, 146.900 FM South East, 146.925 FM Central North, 147.825 FM Gawler, 438.425 FM Barossa Valley, 438.475 FM Adelaide North, ATV Ch 35 579.250 Adelaide. (NT) 3.555 USB, 7.065 USB, 10.125 USB, 146.700 FM, 0900 hrs Sunday	(F) \$72.00 (G) (S) \$58.00 (X) \$44.00
VK6 West Australian Division PO Box 10 West Perth WA 6872 Phone (09) 351 8873	President Cliff Bastin Secretary Christine Bastin Treasurer Bruce Hedland-Thomas	VK6LZ VK6ZLZ VK6OO	146.700 FM(R) Perth, at 0930 hrs Sunday, relayed on 1.825, 3.560, 7.075, 14.116, 14.175, 21.185, 29.680 FM, 50.150 and 438.525 MHz (G) (S) Country relays 3.582, 147.350(R) Busselton and 146.900(R) Mt William (Bunbury). Broadcast repeated on 146.700 at 1900 hrs Sunday, relayed on 1.865, 3.563 and 438.525 MHz; country relays on 146.350 and 146.900 MHz.	(F) \$60.75 (G) (S) \$48.60 (X) \$32.75
VK7 Tasmanian Division 5 Helm Street Newstead TAS 7250 Phone (003) 44 2324	President Andrew Dixon Secretary Robin Harwood Treasurer Terry Ives	VK7GL VK7RH VK7ZTI	146.700 MHz FM (VK7RHT) at 0930 hrs Sunday relayed on 147.000 (VK7RAA), 146.725 (VK7RNE), 146.625 (VK7RMD), 3.570, 7.090, 14.130, 52.100, 144.150 (Hobart) Repeated Tues 3.590 at 1930 hrs.	(F) \$72.00 (G) (S) \$58.00 (X) \$44.00
VK8 (Northern Territory is part of the VK5 Division and relays broadcasts from VK5 as shown received on 14 or 28 MHz).				
Note: All times are local. All frequencies MHz				
		Membership Grades Full (F) Pension (G) Needy (N) Student (S) Non receipt of AR (X)		Three-year membership available to (F) (G) (X) grades at fee x 3 times

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## TRADE PRACTICES ACT

It is impossible for us to ensure the advertisements submitted for publication comply with the Trade Practices Act 1974. Therefore, advertisers and advertising agents will appreciate the absolute need for themselves to ensure that the provisions of the Act are complied with strictly.

## VICTORIAN CONSUMER AFFAIRS ACT

All advertisers are advised that advertisements containing only a PO Box number as the address cannot be accepted without the addition of the business address of the box-holder or seller of the goods.

# Yaesu FT-840 HF Transceiver



## Performance and Dependability



Looking for a serious HF transceiver that won't break the bank, but don't want to compromise really good performance for the tiny controls, complicated "menus", or poor front-end performance of some of the current micro-rigs?

The Yaesu FT-840 may be just the rig you're looking for, and for a short time only it's at an absolute bargain price.

Covering all HF amateur bands from 160m - 10m with 100w PEP output, and with continuous receiver coverage from 100kHz to 30MHz, the FT-840 provides SSB/CW/AM operation (FM optional), 100 memory channels, a large back-lit LCD screen, two independent VFOs per band, an effective noise blanker, and an uncluttered front panel, all in a compact case size of just 238 x 93 x 243 (WHD).

This is a very easy-to-use transceiver, and unlike some competing models, small size doesn't mean small facilities. Some micro-rigs can't even activate simple functions like a noise blanker without using multiple keystrokes, but not so in Yaesu HF transceivers. The FT-840 provides easily accessible features such as variable mic gain and RF Power controls, SSB Speech Processor for greater audio punch, and IF Shift plus CW Reverse to fight interference. Dual Direct Digital Synthesisers ensure clean transmitter output and fast Tx/Rx switching, as well as greatly improved receiver performance compared to earlier PLL designs. The low noise receiver front-end also uses an active double-balanced mixer and selectable attenuator for improved strong signal handling, so you can fight through pile-ups rather than have to worry about overload from other local signals.

The FT-840 weighs just 4.5kg, and uses a thermally switched cooling fan, surface mount components and a metal case for cool, reliable operation. An extensive range of accessory lines are available, including the FC-10 external automatic antenna tuner, so you can customise the FT-840 to suit your operating requirements.

With the next solar cycle just around the corner, why not get ready to enjoy the great conditions with an HF rig you'll really have fun using. For performance and dependability at a great price, you can't go past the Yaesu FT-840.

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